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THE DESTRUCTION OF TUMORS OF THE URINARY BLADDER BY A HIGH-FREQUENCY CURRENT EFFECT, KNOWN AS DESICCATION[1]

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THE treatment of tumors of the bladder is one of the most extensively debated subjects of surgery. The proper method of procedure should hinge upon the determination of the benign or malign condition of the tumor. Unfortunately, in the vast majority of cases, this is impossible, even by the expert cystoscopist. The endovesical removal of a piece of the growth for microscopical diagnosis is strongly to be condemned, for two reasons: Firstly, the removal of a section of the tumor in this manner invites metastasis; secondly, the section is usually small, taken from the top or side of the growth and not from its juncture with the mucosa. Consequently, the pathologist's report is valueless, inasmuch as, even when the tumor with its associated vesical mucosa has been excised suprapubically, repeated serial sections have been necessary to establish the diagnosis. Moreover, the microscopical determination of the actual state of the tumor, whether a pure papilloma or a very early carcinoma, is of little moment

[1] Read in the Section on Surgery, Medical Society of the State of Pennsylvania, Harrisburg Session, September 27, 1911.

Fig. 2 (Case 1). August 24, 1910. Cystoscopic view of a portion of the bladder tumor before high-frequency desiccation was begun. The growth, 4 to 5 cm. in diameter, was ulcerated and bleeding in places and covered with blood coagula and exudate, suggestive of malignancy.

Fig. 3 (Case 1). January 19, 1911. Appearance of the tumor drawn from cystoscopic view, just before the eleventh treatment by desiccation. The tumor is approximately one tenth of its original size, and, as will be seen, is not completely included in the visual field.

Fig. 4 (Case 1). March 2, 1911. Two weeks following the thirteenth high-frequency desiccation. A slight, grayish-white exudate marking the site of the former tumor, posterior to the ureteral orifice, is indistinctly visible.

Fig. 5 (Case 2). January 24, 1911. Cystoscopic views of comparatively small, pedunculated growth (1 cm. in diameter) prior to treatment by desiccation.

Fig. 6 (Case 2). March 5, 1911. This cystoscopic drawing, made one week after the third desiccation, demonstrates better than words the destructive effect of the Oudin current. The touch of the electrode caused the devitalized desiccated mass to separate readily from the rest of the papilloma.

Fig. 7 (Case 3). August 25, 1911. A fimbriated papillomatous growth, arising from an area of mucosa about 3 cm. in diameter, in the region of the right ureter. Appearance of the tumor previous to desiccation.

Fig. 8 (Case 3). Drawing made just before the tenth treatment, merely the pedicle remaining of a filamentous tumor mass, so large as to be incapable of total vision in a single field of the cystoscope. The prominence in the lower part of the field is the edge of the hypertrophic prostate.

Fig. 9 (Case 3). Representing the appearance of the bladder wall at the tumor site following the eleventh treatment, when the growth had been totally destroyed. The small, round areas are lacunæ lying within the interstices of hypertrophied trabeculæ.

from the standpoint of treatment. The tendency of papillomata of the urinary tract to metastasis and recurrence, either before or after operative intervention, has been long recognized. In fact, in many instances, it has risen as a specter, waving away any thought of radical operation. Zuckerkandl, last year, before the German Urological Congress, cited the case of a patient with a papilloma of the renal pelvis, of the nature of a mother growth, from which, as offsprings, small papillomata, filling the ureter and bladder, had developed.

Although recent authorities have claimed 50 per cent recurrences following the suprapubic removal of these papillomata, a fact which has been instrumental in influencing the Germans and French to perfect instruments for the endovesical rather than the suprapubic route of attack, nevertheless, in this country, the suprapubic operation, intra- or extraperitoneal, has been the one of choice, because the inventors of the various operative cystoscopes appear to be the only operators sufficiently expert to satisfactorily manipulate them. Consequently, there is no way of recording the end-results relative to metastases and recurrences. If the diagnosis of carcinoma, possibly made by cystoscopy, is reasonably assured, there is but one course to pursue — the suprapubic transperitoneal operation, recently advocated by Charles Mayo, consisting of partial resection or total excision of the bladder. If the malignancy of the neoplasm is far advanced and notably infiltrating, palliative measures alone should be employed. It is quite possible, in small vesical tumors, even in the stage of carcinomatous degeneration, to effect cure by a specialized high-frequency current.

The purpose of this paper is to direct attention to the value, as yet too little realized, of a new electrical effect for the destruction of these troublesome bladder tumors, and incidentally to report four cases successfully treated by this method. By virtue of the simplicity of the technique, capable of being employed by anyone familiar with cystoscopy, and a belief in the superiority of the result over that obtainable from the common operative cystoscope, we are strongly of the conviction that in high-frequency desiccation, erroneously styled fulguration,[1] the surgeon has at his command a new measure that will challenge, rival, and surpass in effectiveness the long-established methods of treatment of intravesical neoplasmata. Indeed, it is a serious question in the mind of the writer whether or not a patient with a bladder papilloma should ever, in the future, be subjected to a radical operation, when treatment by this method is available.

To Beer of New York is due priority in making practical the endovesical destruction of tumors with the monopolar high-frequency current, by having a properly insulated 6-ply copper wire electrode constructed, capable of use in the catheterizing cystoscope, and by persistence in his belief that tissue destruction could be accomplished by direct contact of the electrode to the tumor, without the necessity of an intervening air space for the passage of the spark. The Oudin current, therefore, is not a new idea, having been utilized for the past fifteen years for the removal of cutaneous or surface growths. Fig. 1, reproduced from de Keating Hart, illustrates diagrammatically in what manner the Oudin unipolar high-frequency current is produced from the usual street current.

It is claimed by expert electro-therapeutists that a static machine is superior to a coil in the production of this current, inasmuch as there is an absence of interruptions, resulting in a circuit of free oscillations, and, consequently, productive of much less heat with a similar output of electricity. Be that as it may, theoretically, practically at least, we have obtained equally good results with coil and static machine, and at present employ with entire satisfaction a high-frequency apparatus possessing a superior induction coil constructed by Wappler of New York.

During the past two years, Beer, Keyes, Buerger, Wolbarst, McCarthy, Elsberg, and Ware have reported 38 cases of bladder tumor, benign and malignant, treated by the high-frequency current. In all the benign papil-

[1] The distinction between oscillatory desiccation and fulguration is well demarcated. The former, by the continuous effluve of a current of low amperage from an extremely high voltage, produces a dehydration of tissue, resulting in blanching, devitalization and drying; the latter, by interruptions or shocks, hence more painful, produces a combustion, resulting in blackening, charring and cauterization of the tissue. The former is penetrating, the latter superficial, in effect.

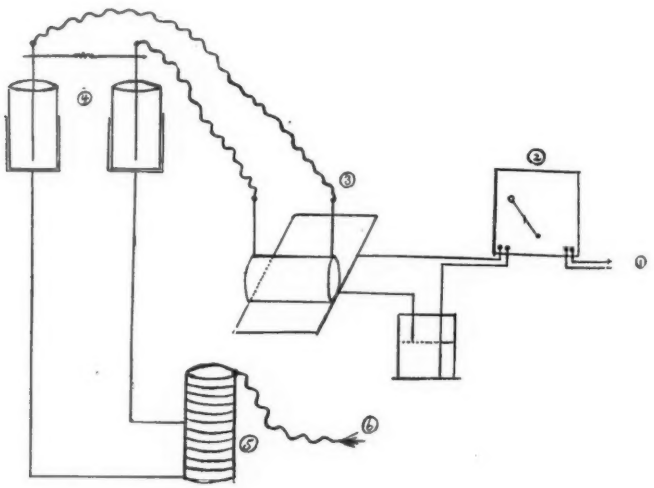


Fig. 1. Diagrammatic representation of generation of Oudin current from street current (after de Keating Hart). If the street current is not of the alternating type, the high-frequency machine must be fitted with an alternator. 1, street current; 2, rheostat, meter, etc.; 3, induction coil and interrupter; 4, condenser and spark gap; 5, Oudin resonator; 6, electrode delivering, high-frequency current.

lary growths the results have been uniformly successful, some cases having been under observation for over a year with no evidence of recurrence.

The four cases reported in this article are the first in the state of Pennsylvania to undergo successful treatment by high-frequency desiccation for intravesical tumors. All four of the cases have been at least temporarily cured. One, presenting the largest papilloma we have ever seen, has evidenced no recurrence for the past year; the other, cured nine months ago, is at present absent from America and a recent cystoscopy to note his condition has been impossible; a third case is at least temporarily cured; the fourth case, also cured, is included in a foot-note of this article.

The detailed reports are as follows:

CASE 1. I. G. A., male, aged 61 years; referred by Dr. Philip Marvel of Atlantic City and Dr. Edward Martin of Philadelphia, for cystoscopy and high-frequency desiccation, respectively. Patient gave a history of slight urinary trouble of a year or more in duration. Hæmaturia developed eight months prior to examination, and was of intermittent type until six weeks ago, since when it has been continuous and excessive, resulting in marked anæmia, weakness, and loss of weight.

August 24, 1910. Cystoscopy: Examination demonstrated a cauliflower-like tumor, measuring approximately 4 to 5 cm. in its various diameters, situated directly in the region of the left ureteral orifice, obscuring that opening from view. The growth appeared sessile in type, was ulcerated and bleeding, and covered with blood coagula and whitish exudate, presenting a friable and malignant appearance. (Fig. 2.) The bladder was elsewhere normal, save for trabeculation incident to moderate prostatic hypertrophy. Dr. Martin declined to operate, and recommended high-frequency desiccation as offering the better chance for recovery.

October 1, 1910. High-Frequency Desiccation: In conjunction with Dr. Wm. L. Clark, caring for the electrical end of the procedure, five or six applications, lasting from five to fifteen seconds each, were made to the top and side of the tumor. A hypodermic of $\frac{1}{4}$ grain of morphine and one half ounce 10 per cent beta-eucaine lactate insured satisfactory urethral anæsthesia. (Demonstrated to Dr. Clark.)

October 10, 1910. High-Frequency Desiccation: Hæmaturia had decreased 75 per cent since last treatment. The summit of the growth showed distinct loss of tissue. Four applications of five to ten seconds each in duration were made. Tumor seemed slightly tender. (Demonstrated to Dr. J. Darwin Pines.)

October 20, 1910. High-Frequency Desiccation: Hæmaturia has entirely ceased. Six applications of the electrode, averaging ten seconds each, were made. Tumor is definitely decreased in size and is

very irregular on its surface. (Demonstrated to Dr. Barton Cooke Hirst and Dr. W. H. Schmidt.)

October 27, 1910. High-Frequency Desiccation: Strength of current was slightly increased, and patient received six applications of fifteen seconds each. Patient seems weak; his appetite is poor, and urine shows leucocytes, erythrocytes, and albumen, ⅛ by volume. Urinary antiseptic stopped and tonic administered. (Demonstrated to Dr. Frederic Law.)

November 17, 1910. High-Frequency Desiccation: After omission of treatment for three weeks patient is markedly improved physically. Tumor seems to be about three quarters of its original size and quite friable. Eight applications of ten seconds each made to tumor. Treatment more painful, but strength of current was greater. (Demonstrated to Dr. Melvin M. Franklin.)

December 1, 1910. High-Frequency Desiccation: Tumor reduced to one half its former size. Six applications of the electrode of fifteen seconds each were made.

December 8, 1910. High-Frequency Desiccation: Applications of the electrode seemed more painful as base of tumor is approached. For the first time, a view of one of the pedicles, ¾ cm. in diameter, of the growth, was obtainable, demonstrating the pedunculated character of the tumor. Four applications of twenty seconds each were made.

December 9, 1910. High-Frequency Desiccation: Four applications of fifteen seconds each were made. Growth is steadily decreasing in size.

December 29, 1910. High-Frequency Desiccation: Tumor seems not to be over one quarter of its original size. Four applications of fifteen seconds each were made; one directly on the exposed pedicle.

January 5, 1911. High-Frequency Desiccation: Growth is not more than one tenth of its original size. Five applications of ten seconds each, using a weaker current, were made.

January 19, 1911. High-Frequency Desiccation: Tumor seems about same size as at last treatment and presents three conglomerate masses. (Fig. 3.) Treatment was more painful, and only two applications of fifteen seconds each of electrode were made.

February 2, 1911. High-Frequency Desiccation: Very slight decrease in size of growth since last treatment. Four applications of fifteen seconds each of a stronger current were made. (Demonstrated to Dr. Geo. M. Dorrance.)

February 16, 1911. High-Frequency Desiccation: One area ½ to 1½ cm. and two or three pea-sized areas are all that remain, demonstrating, however, a triple pedicle to the tumor. Ureteral orifice visible for the first time and apparently uninvolved by this growth. Patient says he feels better than for a year. Three applications of fifteen seconds each were given.

March 2, 1911. Cystoscopy: A small, whitish area, evidently a superficial ulcer covered with exudate, marking site of tumor, is alone visible. (Fig. 4.) No treatment.

March 30, 1911. Cystoscopy: Impossible to define any evidence of the former papilloma.

Discharged to report in three months for examination by cystoscope.

September 4, 1911. Patient enjoys perfect health. Claims that he feels better than for years. No signs or symptoms of urinary disturbance.

PATHOLOGICAL REPORT

"Laboratory No. 3148. October 11, 1910. Microscopical examination of the small piece of tissue removed from the bladder shows a process which consists largely of irregular-looking epithelium, which is suggestive of a malignant process. Owing to the smallness of the tissue and the inability to state whether the process is infiltrating in nature, the diagnosis cannot be positive. In some respects the process resembles a papilloma. Diagnosis: Papilloma (probably a carcinomatous degeneration)." Signed: JOHN SPEESE, M. D.

A résumé of the above case demonstrates the following features: The tumor must be classified as a papilloma, in spite of some evidence in the pathologist's report to the contrary. The tumor, an unusually large one, was effectively and completely destroyed by 62 applications of the high-frequency electrode, per urethram, in 13 treatments, amounting in actual time to 13¼ minutes. The entire treatment was performed in the absence of general anæsthesia, and practically painlessly. At the time of this report, one year since the conclusion of treatment, there has been no evidence of recurrence.

CASE 2. C. G., male, aged 45 years; referred by Dr. E. H. Siter of Philadelphia, for high-frequency desiccation of a bladder papilloma, accidentally discovered by Dr. A. A. Uhle, during a cystoscopic examination for another purpose.

January 24, 1911. Cystoscopy and High-Frequency Desiccation: The cystoscope revealed a small, pedunculated tumor, about 1 cm. in diameter, just anterior to the right ureteral orifice. (Fig. 5.) Employing the high-frequency cable through a catheterizing cystoscope, using posterior urethral anæsthesia of one half ounce of 4 per cent beta-eucaine lactate, one application of the electrode for five seconds was made, the spark gap between the poles of the condenser being 1 mm. (Demonstrated to Drs. Siter, Uhle, and Mackinney.)

January 28, 1911. High-Frequency Desiccation: The papilloma was very slightly affected by the former treatment, the current being too weak, showing merely slight excavation and a brownish-red coloration on its right side. Increasing the condenser spark gap to 2 mm., four applications of ten seconds each were made. (Demonstrated to Dr. Ivy.)

February 25, 1911. High-Frequency Desiccation: Growth has decreased to only one quarter of its original size. Owing to the location of the tumor, the process of desiccation is limited to one

side of the growth. Two applications of the electrode for ten seconds each were made.

March 5, 1911. High-Frequency Desiccation: The tumor presented the appearance depicted in Fig. 6. Approximately three fourths of the growth observed at the previous treatment was ashen-white, devitalized and completely desiccated, illustrating better than words the nature of the effect produced. One application of fifteen seconds duration was made to the remainder of the tumor.

March 7, 1911. Cystoscopy by Drs. Uhle and Mackinney demonstrated merely a dark ulcer, marking the site of the former papilloma. Patient discharged from the University Hospital to report at his convenience for further observation by the cystoscope.

Résumé: In this case the Wappler coil high-frequency apparatus was employed instead of the static machine. More treatments were given than necessary, as this was the first time we had used the coil effect. The papilloma was destroyed by eight applications in four treatments, the actual time of desiccation covering 1⅓ minutes. The current generated by the coil seemed just as effective, no more painful, and the result equally brilliant to, if not more brilliant than, that obtained from the static machine used in Case 1.

Case 3. E. R., male, aged 71 years; referred by Dr. A. Haines Lippincott of Camden, for high-frequency destruction of suspected intravesical tumor. The patient presented the following history: Some years ago an epithelioma was removed from the side of the nose by the X-rays. In October, 1907, was treated for the first time for a stubborn hæmaturia, lasting two and a half weeks, although for nine years previously he had suffered from frequency of urination, both day and night. During the past four years he has had four slight attacks of hæmaturia, insufficient to confine him to bed.

August 25, 1911. Cystoscopy and High-Frequency Desiccation: The cystoscope demonstrated a tumor in the region of the right ureteral orifice. The growth seemed to spring, as loosely-arranged papillomatous processes, from an area of mucosa about 3 cm. in diameter, surrounding the orfice of the ureter, and extending principally in the direction of the vesical neck. (Fig. 7.) Four applications of five seconds each of the Oudin current were made. The treatment was absolutely painless, the anæsthetic used being one half ounce of a 4 per cent beta eucaine lactate solution, instilled into the posterior urethra.

September 19, 1911. High-Frequency Desiccation: The urine was much clearer than at time of first treatment. The tumor was slightly diminished in size, but appeared much more friable. Four applications of eight seconds each of the high-frequency electrode and two of ten seconds were made.

October 3, 1911. High-Frequency Desiccation: Tumor appears about one fourth its original size. Three applications of five, ten, and fifteen seconds, respectively, of the electrode were made. A mass of tissue removed on the end of the electrode was submitted to Dr. John Speese for pathological examination.

PATHOLOGICAL REPORT

"Laboratory No. 3730. October 10, 1911. The microscopical examination reveals irregular areas of epithelium, some of which are flat and squamous in appearance; the connective-tissue stroma is poorly developed, so that it is impossible to state whether the process is invasive in character. From certain evidences of irregularity in the arrangement of the epithelium, the process appears to be undergoing some metamorphosis. Diagnosis: Papilloma of the bladder."

October 13, 1911. High-Frequency Desiccation: Tumor appears about 2 cm. in diameter. Six applications of four seconds each were made. (Demonstrated to Dr. McKay.)

October 20, 1911. High-Frequency Desiccation: Patient has had slight hæmaturia at times since last treatment. The electrode was applied ten times for five seconds each.

October 27, 1911. High-Frequency Desiccation: Eight applications of ten seconds each were made to the surface of the tumor.

November 2, 1911. High-Frequency Desiccation: Tumor is appreciably smaller, being not more than one tenth of its original size. Six applications of ten seconds each were made.

November 16, 1911. High-Frequency Desiccation: Tumor mass is about the size of a cherry. Four applications of ten seconds each were made. Patient seems nervous and bladder more irritable than formerly.

December 7, 1911. High-Frequency Desiccation: Pedicle base size of pea persists. Owing to trouble with the resonator of the machine, the desiccation was ineffectual, nothing being accomplished by the treatment. (Demonstrated to Dr. Chas. W. Bonney.)

December 28, 1911. High-Frequency Desiccation: Pedicle remains. (Fig. 8.) Has had considerable frequency of urination for the past four weeks, due undoubtedly to instrumentation during past treatments, in attempting to reach the growth to one side of a considerably enlarged prostate. Four applications of the electrode of ten seconds each were made.

January 25, 1912. High-Frequency Desiccation: A very small, filamentous sprout of tissue exists at the site of the tumor. This was completely destroyed by one application of two seconds duration, and the patient discharged cured to report for cystoscopy in a month to Dr. Lippincott, who witnessed and assisted at all the above treatments. (Fig. 9.)[1]

[1] Since the presentation of this paper, a fourth case has been successfully treated by the Oudin current.

J. B. H., aged 54, was referred by Dr. W. E. Jonah of Atlantic City, for cystoscopy on October 26, 1911, and, subsequently, for high-frequency desiccation. Four years previously, a suprapubic cystotomy was performed for the excision of a tumor of the bladder. The cystoscopic examination was prompted by the recent development of hæmaturia and frequency of urination. The cystoscope revealed on the

TECHNIQUE OF PROCEDURE.

The instrumentation is precisely that employed for ureteral catheterization. It is advisable to use a double catheterizing cystoscope of the Brown-Buerger type.[1] The advantage of employing two instead of one specially insulated wire cables, constructed so that they may be introduced through the catheter channels of the cystoscope, is that it makes it unnecessary to withdraw so frequently the electrodes, in order to clip off their tips, which, as a result of the current, have the insulation melted from them and become welded, as it were, to the tissue in the areas of the tumor treated. So firm is this welding at times that the entire growth can be freely moved on its pedicle by the cable, which requires a considerable pull to free its tip from the tumor, removing at the same time sections of tissue which may be utilized for microscopical study. The insulated electrode attached to the Oudin resonator and terminal of a high-frequency apparatus[2] is passed through the catheterizing cystoscope and its tip made to invaginate the surface of the growth, preferably the pedicle, if visible (this is usually not the case), and the electrical current allowed to pass, "make and break," best controlled by a foot-switch. The spark gap between the poles of the condenser should be from 1 to 3 mm. in length; the longer the spark, the stronger the current. The best gauge of the proper strength is obtained by observing the effect on the tumor. The application should not be painful, or, at least, not unbearably so. No spark should be visible. The immediate effect is the production of small bubbles of hydrogen gas, seen to rise through the liquid content of the bladder from the point of application of the electrode. This is followed by a blanching of the tissue, due to dehydration or oxidation, resulting in complete devitalization. The dead tissue sloughs away in a few days. Treatments should be given not oftener than twice a week, usually weekly and frequently at intervals of two or three weeks, depending upon the amount of cellular reaction produced. Great care must be exercised not to desiccate the normal bladder wall, otherwise perforation might be readily produced. A general anæsthetic may be employed, but has never been necessary in our experience.

anterior wall of the bladder, presumably at the former operative site, a diffuse papillomatous formation — a main growth, 3½ to 1 cm., and a number of smaller surrounding whitish, feathery papillomata. Located in the vertex of the bladder were two pedunculated papillomata about 1 cm. each in diameter. Six treatments by the Oudin high-frequency current, extending over a period of two months, sufficed to rid the bladder of all papillomata, amounting in all to a total of two and a half minutes of continuous application of the electrode.

Remarks: This case was peculiarly adapted to treatment by this means, inasmuch as the patient had become a victim to recurrence of the disease. Not only was there no likelihood of cure from any formidable cutting operation, but, moreover, he was in an advanced stage of nephritis, making him a very serious operative risk from the standpoint of general anæsthesia.

[1] Instead of the indirect vision cystoscope, as recommended, having the greatest applicability and nicety of control for this method of endovesical treatment, the direct-vision instrument may be utilized. Indeed, it is not improbable that an instrument will be devised for the sparking of these growths through an air medium; if so, the destruction of the tumor can be accomplished more speedily.

[2] The Excell high-frequency apparatus, manufactured by the Wappler Electric Manufacturing Company of New York, is a most effective, although somewhat costly, machine. We have used it with the greatest satisfaction, not only for the destruction of bladder tumors, but also for tumors of other hollow viscera, and especially for cutaneous growths, both benign and malignant.

CONCLUSIONS

1. High-frequency desiccation promises to be the method of the future for the treatment of papillomata of the bladder.

2. The coil seems as effective as the static machine for the generation of the high-frequency current.

3. The Oudin current possesses no selective action for pathological tissue, as has been claimed, and will destroy normal tissue with equal readiness.

4. Recurrences and metastases promise to be less frequent than by either suprapubic or intravesical incision, and, even should they occur, are far more amenable to a repetition of similar treatment.

Finally, I desire to express my gratitude to Dr. Edward Martin for suggesting to me the possibilities in this method of treatment and for encouragement rendered in the work.

THE SIGNIFICANCE OF BLOOD IN THE STOOLS[1]

With Report of Cases

By J. M. T. FINNEY, M. D., Baltimore

IN these days of feverish haste and rapid progress along therapeutic lines, as shown by the legion of new methods and new operations, the tendency to slight the little things and grasp at the big, to belittle diagnosis, to curtail physical examinations, to jump at conclusions, has become pronounced. In other words, this is not the day of small things. At the outset, then, let me say that this paper is a protest against the tendency to overlook and to discount the fundamental importance of attention to detail in matters of diagnosis. This, in turn, is due to the mad rush after the main chance. Too often does one hear, in meetings of local and even national medical societies, some popular idol, some gallery god, decry in vociferous tones against the evils and dangers of the so-called "laboratory methods" until, as a result, that phrase has come to be looked upon as a term of reproach by some not well informed. We are told that while the laboratory man is busy counting the blood, or looking for parasites, or estimating the hæmoglobin, or examining the stools or urine, or the fluid aspirated from some cavity of the body, the patient may be dying. The thing to do is to grasp the situation at a glance, instant decision, rapid execution, rescue the perishing patient, and restore him to the fond embraces of his anguished family before the bewildered, tortoise-paced laboratory man has had time to say the proverbial "Jack Robinson." All this is very fine, catchy, heroic, grand; but when soberly analyzed, what does it mean? Incomplete histories, imperfect examinations, crude analyses, immature judgments, faulty conclusions—a snap diagnosis, at times strikingly brilliant, at others still more palpably, even egregiously, wrong. In the political world in these days of insurgency and progressivism, reactionaries and standpatters, the view that one gets of these different positions is largely dependent upon the color of the partisan glasses through which each one in turn is viewed. Each position has its peculiar merits and demerits, but through and behind them all there is a safe and sane policy, which, when intelligently understood and conscientiously followed, will yield in the aggregate the best results, the greatest good to the greatest number, which is, after all, the consummation to be devoutly wished. What is true in the political world is equally true in the world of medicine and surgery. The faddist, always interesting, sometimes just a bit tiresome, has his day and passes; but those practices which are fundamentally based upon accurate observation, careful analysis and scientific accuracy will stand any test put upon them, and when properly made use of in intelligent, conservative, surgical practice will redound to the increased longevity of the human race and to the credit of our glorious profession.

In a previous paper, the speaker has endeavored to warn against this pernicious practice to which he has just referred, and to urge on the part of the examining surgeon the most careful and thoughtful study of every fact developed in the course of a carefully taken history, or a thorough routine physical examination. So much depends upon a proper sifting of the crude material thus obtained and the relative importance to be attached to each particular fact or group of facts, and upon the correct interpretation of these various signs, that it is difficult to over-estimate the importance of a broad point of view, and the value of the special aids to diagnosis, the so-called "laboratory methods." Here shines out with striking brilliancy that rare quality, that much to be desired characteristic, known as surgical instinct, good judgment, or uncommon sense. Trite and hackneyed as all this may appear, nevertheless it is supported by

[1] Read before the Clinical Congress of Surgeons of North America, Philadelphia, November 13th, 1911. See discussion, page 402.

the weight of ancient and honorable authority, for since the day of Hippocrates it has been recognized, by those best qualified to judge, that diagnosis is, after all, of relatively greater importance than treatment, since upon the correctness of the one depends in large measure the effectiveness of the other. How often has it happened in the experience of all of us that the attention has been arrested by some apparently trivial or commonplace circumstance, which has led to a correct solution of the diagnostic problem under consideration! How often, too, on the other hand, has the failure to notice or properly interpret some apparently insignificant fact, such, for instance, as the appearance of blood in the stools, microscopic or macroscopic, prevented the recognition of a condition that, looking backward, one realizes would have been made clear, had only the apparently insignificant fact received the attention which it deserved!

The specific subject of this paper embodies the foregoing general principles, and serves to illustrate the point that the speaker wishes to make. It was called to his attention by the occurrence of blood in the stools in a number of rather unusual and obscure cases, which will presently be narrated. Interest in this group of cases led to a consideration of the possible causes and the explanation of this phenomenon. I was at once struck with the number and variety of conditions under which either visible or occult blood may occur in the stools. At the risk of seeming to an assemblage such as this elemental and perhaps unnecessarily commonplace, a brief classification of some of the more important of these causes will be presented. Blood appearing in the stools in sufficient quantity and fresh enough to be recognized by the naked eye is, of course, easy of detection, requiring only an inspection of the stools. It may occur, however, in microscopic amounts only and at irregular intervals, and may require the aid of special tests in order to detect its presence. These tests, while not specially complicated, for obvious reasons are better made in the laboratory by trained observers. The tests themselves are so purely technical in character as to require no further mention at this time.

Right here attention should be called to the fact that there may be present in the food certain substances which may easily be mistaken for blood, either from their naked-eye appearance or from their chemical reactions. Without going into these in detail, it may be mentioned that the most important of them are flesh foods, certain vegetables containing oxydases and drugs containing salts of the heavy metals, such as iron. Very recently Newbold of this city has found in watermelon another vegetable substance which gives to certain chemical tests a reaction so similar to that of blood as to render it necessary to look for more accurate tests than those hitherto employed. Assuming that one has to deal with blood which really is derived from the patient, and not an accidental contamination, the sources of such blood may be anatomically divided into two groups, that is, those oral to the cardia of the stomach and those aboral to it. In other words, blood that has or has not been swallowed may appear in the stools. The first of these two groups includes blood coming from the nasal cavities, the gums, the tongue, lips, cheeks, pharynx, esophagus, lungs, etc. The pathological causes underlying these numerous sources of hæmorrhage are most varied, but taking this group as a whole, it presents much less interest and significance than the second group referred to above, and will be dismissed with simple mention. As a rule, the blood getting into the stools has its origin from the gastro-intestinal tract, rather than the respiratory. Blood coming from the upper portion of the former and from the latter has little importance, and is of significance only in that it must be ruled out before attributing hæmorrhage to structures below the diaphragm.

The great and important group of cases in which blood originates from sources below the cardia of the stomach may be subdivided into several classes, depending upon their pathological basis. These classes may be grouped as follows:

1. Trauma. In this class belong hæmorrhage due to the ingestion of hard or sharp foreign bodies, external violence, and probably also parasites such as bothriocephalus and ankylostomum; and fissure ani due to injury

of the anal mucosa from the passage of large, hard fecal masses.

2. Disorders of the gastro-intestinal tract proper. (*a*) Mechanical disturbances such as strangulated hernia, intussusception, volvulus bands of adhesions and other types of obstruction. In this group also should be placed cases of severe motor disturbances of the stomach without ulcer or cancer. (*b*) Functional disturbances rarely associated with the presence of blood in the stools, such as marked hyper-acidity of the stomach. (*c*) Inflammatory lesions, both acute and chronic, are frequently the cause of the bleeding. Among the lesions quoted by various authors are ulcers of the different types, such as peptic, typhoidal, tuberculous, dysenteric and luetic. These diseases, of course, present great differences in their course and history, but are alike in that each of them may be the cause of blood in the stools. Other inflammatory lesions producing the same symptom are alcoholic and other forms of gastritis, chemical gastroenteritis, such as mercuric poisoning, pyloric and intestinal stenoses, following inflammations, and that interesting condition known as linitis plastica, or cirrhosis of the stomach. It is worthy of note in many of these conditions, that while there may be at times profuse bleeding, blood is not found constantly present in every movement of the bowels, as is so uniformly the rule in the group next to be considered. (*d*) New growths, benign and malignant. The most important member of this group by far is cancer of the stomach, in which disease blood, at least in small amounts, is very constantly present in the stools. Cancer of any portion of the alimentary tract, of course, is included here as well as the rarer sarcomata, and those interesting benign cases of multiple adenomata, polyposis, lipomata, etc. Of diagnostic significance is the fact that bleeding is less regular in the benign cases. (*e*) Circulatory disturbances. In some conditions belonging to this group, as chronic passive congestion, esophageal varices and certain cases of hæmorrhoids, the underlying trouble must be sought in a lesion elsewhere, perhaps a cirrhosis of the liver or a heart with broken compensation. Other circulatory disturbances, however, may be evident only in the vascular supply of the gastro-intestinal tract itself, as for example, mesenteric infarction and portal thrombosis. To this group belongs the lesion which more frequently than any other causes blood in the stool, namely, hæmorrhoids.

3. The third large group which may be differentiated is that in which bleeding is associated with some disease of the organs directly connected with the gastro-intestinal tract. Of particular significance is this group, because of the tendency that the finding of blood in the stools has to direct the attention toward the alimentary tube proper, and away from associated organs where the trouble really lies. The liver and its biliary tract furnish a number of conditions in which bleeding may be occasionally found. Any form of jaundice, even the simple catarrhal type, from the well-known tendency toward hæmorrhage which characterizes cholemia, may be the cause of blood appearing in the feces. Cirrhosis of the liver, noted above, may lead to passive congestion and bleeding into the hollow viscera. Cancer of the liver or of the gall-bladder, in the ulcerative stages, has been known to cause bleeding into the intestine. The mere presence of gall-stones in the gall-bladder may be associated with blood in the stools, as will be illustrated by cases to be presently reported. Among the ways in which the bleeding may be accounted for in gall-stone cases are to be mentioned associated jaundice and ulceration from the stones lodged either in the gall-bladder or ducts. Of course, where the gall-stones produce a fistulous opening into the bowel, hæmorrhage to some extent is to be expected. We have found it associated with gall-stones in the gall-bladder without jaundice, ulceration or fistula. So far as we can find, this fact has not before been noted in the literature. Cancer of the pancreas and hæmorrhagic pancreatitis may also give rise to melena. The occurrence of blood in the stools in the course of appendicitis is well known, though relatively infrequent. Kelly notes four cases out of nearly a thousand reported, in which blood was found in the feces.

4. The last group is a more or less heterogeneous one, consisting of numerous general

diseases or conditions which may be associated with gastro-intestinal hæmorrhage. The most striking subdivision of this group is the diseases of the blood-forming organs. Here belong pernicious anæmia and leukemia, and allied to them in a general way are hæmophilia, purpura, scurvy and melena neonatorum. Less closely associated is the interesting condition of vicarious menstruation. A second less definite sub-division may be recognized in certain chronic disorders of the type of arteriosclerosis, uræmia and amyloid diseases. Certain individual cases of these diseases are characterized by the occurrence of blood in the stools. Lastly, there are certain isolated conditions, such as beriberi, pellagra, tetany, brain tumor and the gastric crises of tabes, which are not allied with any other class.

From the foregoing enumeration of some of the principal causes of bleeding, it will readily be seen that a grave error is made in the too common assumption that this symptom always means the presence of ulceration somewhere in the intestinal tract. To further emphasize the diversity of conditions in which bleeding may be an important part of the clinical picture, a few cases that have recently come under our notice presenting this common symptom, but differing in many other respects, will be briefly detailed.

J. W., aged 22 years, medical student, entered the Johns Hopkins Hospital complaining of abdominal pain. His family and past history are unimportant, except for the fact that he has for several years had occasional attacks of indigestion associated with vomiting. His present illness began at 4 A. M. on the day before admission, with severe abdominal pain just below the left costal margin. The patient induced vomiting, but this did not stop the pain. In the afternoon, he vomited twice spontaneously. Examination showed slight rigidity and tenderness in the left epigastric region about half way between the umbilicus and costal margin. Otherwise, his physical examination was negative. The next day, the patient complained of tingling in both hands, and later developed the typical contractures of tetany. Chvostek and Trousseau signs were present. This condition of tetany persisted for about two days and then disappeared. The patient remained in the hospital from May 19, 1911, until July 14, 1911, and from the time of his admission until June 8th, a period of three weeks, the stools were tarry, and daily gave a positive reaction for blood with the guaiac test. After June 8th, the stools became negative for blood, and the patient had no recurrence of symptoms.

Interest in this case prompted a search for further evidence of relationship between tetany and the presence of blood in the stools. Little was found bearing upon this point, but a review of the records of the Johns Hopkins Hospital shows the following interesting cases:

1. A patient with pyloric stenosis and gastric dilatation who suffered with tetany and had blood in his stomach contents and stools.

2. A patient with advanced cancer of the stomach who had tetany. No note was made on the occurrence of blood in the stools, as it was one of the early cases treated in the hospital, but, from the autopsy report, there is little question that a search would have revealed it.

3. A case of ulcer of the stomach with gastric dilatation and tetany.

4. A case of typhoid fever with tetany and blood in the stools.

Another group of cases may be briefly typified by the following instance:

Miss E. J. F., aged 43 years, entered the Union Protestant Infirmary complaining of stomach trouble. Her general health had always been poor and she had had typhoid fever at 12 years of age. Following this, she had always had indigestion. She had been operated upon previously for pelvic conditions. Has frequently vomited, the vomitus sometimes containing blood. Has pain in the epigastrium, has been constipated, never has been jaundiced. Has lost no weight. The examination of her gastric contents was practically normal except for the presence of a good deal of blood. An exploratory laparotomy revealed, after a systematic search, nothing abnormal except a gall-bladder full of stones. The ducts were free. A cholecystostomy was performed and the patient recovered uneventfully, except for an acute dilatation of the stomach which developed shortly after operation, and which was quickly relieved by the prompt and repeated use of the stomach tube.

Mr. W. H. D., aged 37 years, entered the Union Protestant Infirmary complaining of ulcer of the stomach. For two years, the patient has had pain in the lower abdomen indefinitely localized, and has also complained of vague digestive disturbances. Some time ago, he was treated in a Washington hospital, but without material benefit. Occult blood was discovered in the stools, which gave rise to the diagnosis of probable gastric or duodenal ulcer. He was relieved for some time by medical means, but his trouble returned with increased

severity, and he presented himself for operation. Physical examination was practically negative. This patient was explored and no evidence of any gastric or duodenal ulcer was found, nor was any other abnormality noted. As there was no indication for operative interference, not even a pathological appendix, the abdomen was closed and the patient made an uneventful recovery. A report from his physician, within a few days, states that he has had no return of his bleeding, after a period of over one year.

Several cases with almost identical findings, that is, no discoverable lesion, have come under my notice,.but this one only is reported as a type.

An unusual tumor of the intestinal wall, which was difficult of exact diagnosis until the tissue had been removed and examined, follows:

Mr. J. D. W., aged 35 years, complained of abdominal pain and blood and mucus in the stools. For five weeks the patient had had pain and diarrhœa, the stools being streaked with blood. The pain was in the left side of the abdomen and crampy in character. This condition grew steadily worse until his admission to the hospital. Upon examination, the muscles of his abdomen, particularly the left rectus, were found to be so rigid that palpation was very difficult. There was tenderness all over the left side. Examination of the stools showed a great deal of mucus and blood recognizable by the naked eye. At operation, a tumor was found which had originated from the mesenteric attachment of the descending colon and become invaginated into the bowel, causing almost complete obstruction. Dr. Wharton of this city has recently reported an almost identical case. A resection of the large intestine from the middle of the transverse colon to the sigmoid flexure with lateral anastomosis was found to be necessary. This patient recovered, and examination of the tumor showed it to be a lipoma which had developed in the mesentery of the intestine.

An interesting fact was brought out in connection with this case, as showing the possibility of being misled by the laboratory findings. Repeated examinations of the stools by Dr. Simon showed the presence of tubercle bacilli. A provisional diagnosis of tuberculous ulceration had been made in consequence, although intussuseption had been suspected.

The following two cases show the occasional relation between disturbances of the appendix and the presence of blood:

Mr. P. M., aged 50 years, complained of stomach trouble. For about a year he had had discomfort, beginning about three hours after eating. Some months later, he vomited blood on one occasion and had tarry stools. He has lost twenty pounds in weight and has had a good deal of indigestion. Physical examination and stomach analysis were negative. At operation no evidence of ulcer, either in the stomach or duodenum, was found. There was a general visceroptosis. The appendix was long, thickened and bound down by old adhesions. The usual appendectomy and closure were done and the patient made an uneventful recovery, with relief of his symptoms.

Mr. R. B. K., aged 22 years, complained of soreness in the stomach and attacks of cramps. For one and one-half years,he has been subject to indigestion, bleeding and constipation. Ten months ago, he had an acute attack of abdominal cramps, nausea, vomiting and slight fever He has had ten similar attacks since then, sometimes with jaundice. Upon examination, tenderness was found in the middle line of the abdomen above the umbilicus. There was no tenderness in the region of the appendix. Examination of the stomach contents was negative. Examination of the stools was positive for occult blood. An exploratory operation was done and after most careful and thorough examination, no abnormality was found except that the appendix was thickened and inflamed. It was removed and the patient made a prompt recovery with relief of symptoms.

As might be expected, blood is found in cases of Hirschsprung's disease, or megacolon, as illustrated in the case of Mrs. G., aged 53 years.

This patient suffered periodically all her life from abdominal cramps, distension, and obstinate constipation which would clear up usually with enemata. Later, however, symptoms of chronic obstruction developed with mucus and blood in the stools almost constantly. An exploratory operation was done, which revealed the usual giant colon found in Hirschsprung's disease. As the patient was in too serious condition to permit of resection, an ileo-sigmoidostomy was performed. She succumbed to a postoperative pneumonia, owing to her weakened condition.

As a type of one of the very common causes of blood in the stools, the following case is briefly narrated:

Mr. J. F., aged 57 years, has had, for six or seven years, attacks of indigestion of which he took little note. There has been a slight tendency toward constipation. No diarrhœa, nausea or vomiting. For the past five or six years, there has been almost constantly present blood, visible or occult, and mucus in the stools. Thorough examination, including the use of the proctoscope and X-ray, failed

to reveal any positive findings. The case, however, was explored and an anular carcinoma of the descending colon was found, which made necessary a resection and anastomosis.

Miss C. F., aged 48 years, from Charleston, South Carolina, admitted to the Woman's Hospital October, 1911. Complaint, diarrhœa, nervousness and insomnia. Family history negative. Past history, diseases of childhood, several attacks of rheumatism, chronic bronchitis; no visible blood in the stools; no special relation to diet.

Present illness dates from the severe nervous shock of the earthquake of 1886, since which time she has been extremely nervous and suffered from indigestion and insomnia. Examination shows a nervous, pallid, fairly well nourished woman; mucous membranes waxy.

Physical examination, practically negative; slight general abdominal tenderness; blood examination shows marked secondary anæmia, examination of the stools always showed blood in microscopic quantity. After repeated examinations, amœbæ were found present, establishing the diagnosis of amœbic dysentery.

E. P. A., aged 38 years, physician, admitted to the Union Protestant Infirmary February 20, 1910. Complaint, abdominal pain and bloody stools. Family and past history negative. Patient had always enjoyed good health up to ten years ago, when he began to have frequent vomiting attacks, occurring as often as two or three times weekly and mostly at night, and due apparently to slight indiscretions in diet. Vomiting was accompanied by nausea, but no pain or tenderness. Patient was under various forms of treatment for about six years, since which time vomiting has occurred much less frequently, varying from a few weeks to a few months. Accompanying the vomiting attacks, the patient noticed the presence of blood in the stools in sufficient quantity at times to weaken him appreciably. Bleeding occurred only with the movements, which were no more frequent than normal. Blood was always bright red in color. Bleeding has not been continuous, sometimes being absent for a period of one or more weeks, at other times present with every stool. Patient thinks the amount not quite so great as formerly. For the past two or three years has noticed occasional attacks of severe abdominal pain. Attacks began with a desire to go to stool. Onset sudden and severe. Pain begins usually in right side over the appendix region, shooting across lower abdomen to the left side and so severe at times as to cause faintness. The attacks last several hours and are usually nocturnal. Between attacks would be comparatively well, though always more or less discomfort in lower abdomen and for the past few years distinct tenderness has been constantly present in the left iliac fossa. Lately has been troubled much with accumulations of gas. Patient shows evidence of anæmia, as indicated by pallor and sallow complexion. Examination of blood confirmed this. Examination of the abdomen negative, except a distinct resistance and indefinite mass to be felt low down in the left iliac fossa.

Provisional diagnosis, diverticulitis. Operation showed a well-marked lipomatosis of the lower portion of the sigmoid. For about ten inches, the walls of the sigmoid were very much thickened and rigid. Its appendices epiploicæ were many times their normal size. The mesosigmoid several times its normal thickness. The whole process appeared to be an excessive deposit of fat, giving rise to a distinct tumor formation in this portion of the sigmoid. It was decided to resect. This was done and a lateral anastomosis made with some difficulty, owing to the short lower segment. The patient made a good recovery and has since had no recurrence of his bleeding. Microscopic examination confirmed the clinical diagnosis — general marked fatty infiltration of the walls of the sigmoid. No demonstrable ulceration of the mucosa.

These cases have been selected almost at random from a large group containing many other pathological conditions in which blood in the stools was a more or less prominent feature of the clinical history. From them and from the preceding long list of affections, in the course of which melena has been known to occur, the speaker hopes that he has been able to lay a foundation for the support of the main purpose in mind in the presentation of this paper. This purpose is to protest against the prevailing tendency to jump to quick and easy conclusions drawn from certain insufficient clinical data. We have endeavored to show that the simple presence of blood in the stools of a patient suffering from an otherwise obscure affection is by no means an evidence of pathognomonic importance. The conditions with which it may be associated we have found of themselves, so diverse as not to warrant any snap diagnosis, but on the contrary, to indicate the most careful, thorough and painstaking study and investigation. In order to fulfil these conditions, the aid of the despised laboratory man is indispensable. The adoption without his aid of such routine conclusion, as for instance, that this symptom must always mean ulcer-

ation of the mucosa somewhere along the gastro-intestinal tract, is to make a grievous mistake in theory, and one which may lead to disastrous results in practice. The speaker feels that he will have accomplished his purpose, if he has succeeded in showing that so commonplace a symptom as the appearance of blood in the stools may be of most varied and unusual significance, and, in order to give it its proper diagnostic value, may call for the exercise of the highest art of the trained laboratory expert, as well as the diagnostic acumen of the skilled clinician.

STEREO-ARTHROLYSIS[1]

A Preliminary Report and Experimental Study in Arthroplasty

By R. TUNSTALL TAYLOR, M. D., Baltimore

STEREO-ARTHROLYSIS, as the name indicates, is that branch of arthroplasty whose object is to loosen stiff joints and produce new joints with mobility, following ankylosis. The title indicates the paper is preliminary, as the time spent thus far in the investigation at the James Lawrence Kernan Hospital for Crippled Children covers a period of six months only, and the nature of the research has been purely experimental in the laboratories and clinic; therefore, final conclusion should be withheld until more time has elapsed and an increased number of cases are at hand to warrant final judgment. However, the encouraging results so far attained in this investigation sufficiently warrant this preliminary report.

LITERATURE

The treatment of ankylosis in the past century may be described as the forcible separation of the adherent surfaces and the endeavor to maintain motion after the adhesions had once been freed (brisement forcé). This originated with Louvrier, of Paris, and Max Langenbeck, of Hanover. In a very small percentage of the cases, namely, those of synovial agglutination without organic union, the result was gratifying. In the enormous percentage of cases in which the lesions were due to necrosis of the synovial membrane, or to fibrous or osseous union of the articular surfaces, ankylosis recurred after *redressement*, and the limb was in as bad, if not in a worse, condition than before.

In 1826, Dr. Rhea Barton, of Philadelphia, removed a wedge from an ankylosed hip, "sawing through the great trochanter and the neck in a transverse direction." Passive motion was used after three weeks and for a time the false joint remained mobile, but gradually became fixed. (North Amer. Med. and Sur. J., 1827, p. 290.)

J. R. Rogers, in 1830, removed a disc of bone from between the trochanters in an endeavor to accomplish the same thing. In 1838, Berard (Dict. de Med., en 30 vols., xviii, p. 440, 1838) advised section of the condyles after the method of Rhea Barton, with passive motion afterward, for temporo-maxillary ankylosis. In 1840, J. M. Carnochan performed the operation of "maxillary pseudo-arthrosis" by division and inserting wood or cotton between the cut ends. (Lectures on Surgical Anatomy and Operative Surgery.) Diffenbach (Operative Surgery), Esmarch, Richet (Thesé de Concours: Des operations applicables aux ankylosis), Rizzoli and Verneuil recommended division of the bones followed by motion for temporo-maxillary synarthroses.

In 1853, Schuh freed an ankylosed patella with a chisel, but the adhesion recurred. Ollier, by forcible distension, Hueber, by mallet, and Brachi, by manipulation, were equally unsuccessful in permanently freeing the patel-

[1] Read before the Clinical Congress of Surgeons of North America, at Philadelphia, November 14, 1911. See discussion, p. 407.

la. Verneuil (Archives de Medicine, 1860, p. 284) on the theory of pseudo-arthroses following fractures, interposed muscle and fascia successfully in correcting temporo-maxillary ankylosis. In 1862, Dr. Lewis Sayre removed a "roof-shaped" segment from the femur above the small trochanter, with the same object in view, but the natural result followed, as we now can understand, with an improved position, but no motion.

T. Wolff (Berliner Chirurgen Vereinigung, 1895 and 1897) reported nine successful cases following what he terms "arthrolysis," i. e., incision by scalpel and chisel of all the fibrous tissue which hindered movement. Eiselsberg, in two cases in which he employed this, was, however, successful only in one, and Kocher, while in favor of "arthrolysis," modified it by putting the components of the new joint after "arthrolysis" in a position of dislocation for a week or two, when he reduced the dislocation.

Helferich, in 1899, proposed, but did not carry out, his suggestion of inserting a portion of the vastus internus between the patella and femur to prevent reunion.

Cramer (30th Congress of the Deutsche Gesellschaft für Chir., Berlin, April 13, 1901; Arch. klin. Chir., 1901, lxiv, p. 696) reported ten cases of ankylosis of the patella alone, in seven of which the vastus internus was interposed, and six were successful.

Chlumsky, in his article (Centralb. f. Chir., Sept. 15, 1900; Wien. klin. Woch., 1902–3) reasoned that, notwithstanding the good results obtained at times by the interposition of muscle and fascia, and from the reports of Mikulicz, Helferich, Leuz and Riegner, that in large joints the procedure, through failure of preservation of the interposed tissues or on account of technical difficulties, was not all that could be desired. He therefore conducted a large number of experiments based upon the interposition of such non-absorbable substances as plates of celluloid, zinc, rubber, silver, cambric and layers of collodion and absorbable material, such as magnesium, ivory or decalcified bone. In some instances there was a tendency to joint formation, but the end results were unsatisfactory on the whole.

McIlhenny (New Orleans Med. Jour., April, 1901) removed in the inferior maxilla a wedge of bone half an inch wide from the necks of the condyles just above the insertion of the external pterygoids, for temporo-maxillary ankylosis, with a successful result.

Murphy (Jour. A. M. A., May 27, 1905, p. 1671), in October, 1901, interposed flaps of fascia and muscular tissue from the vastus externus between the patella and femur and tibia and femur for an ankylosed knee, with fair result. He reports twelve cases in all, up to January, 1905, some with remarkable results for the correction of ankylosis of the knee, hip and elbow, which he accomplished by the interposition of flaps with broad pedicles obtained from fascia, fat and muscle adjacent to the ankylosed joint. His paper is most interesting, extensive and valuable.

Hubscher (Corresp. blatt f. Schweiz. Äerzte, Dec. 15, 1901, xxxi, p. 785) failed to secure permanent freedom of the patella by the use of the interposition of magnesium foil half a centimeter thick.

Berger (Bull. et Mem. de la Soc. de Chir., 1903, xxix) successfully used the pronator radii teres between the extremities of the bones sutured to the brachialis anticus for elbow ankylosis, and attributes the satisfactory result to the muscular interposition.

Hoffa (Zeitsch. f. orth. Chir., xvii) also successfully used muscle flaps.

Quenu (Societe de Chirurgie, Paris, June 25, 1902), in 1902, interposed soft parts after resection of the elbow for ankylosis. Delbet also praises this method.

Foderl (Über Knochen und Knorpelersatz, Wien. klin. Wochenschr., 1903, xvi, 1424–1429; Jour. A. M. A., 1905, p. 1756), after experimental ankylosis produced by resection, produced mobility again by the insertion of pieces of bladder or the wall of ovarian cysts.

Baer in 1909 (Amer. Jour. Orth. Surg., August, 1909) reported three cases in which he had used cargile membrane between the separated components of the joints with no resultant motion, and with fever for a few days after the operation. In a fourth case, a knee, in which he used cargile membrane and in which fever occurred, the end result

was 10° of motion. After the method of Foderl, he then also used bladder from the pig, which he had chromicized, and this he sutured in the newly separated articulation, with the result in the reported cases of 35° motion in a hip, 35° in a knee, 50° in a hip, 75° in a knee, and 100° in the upper radio-ulnar articulation.

The objection to the method seems to be the postoperative fever, the extrusion of the pieces of bladder through the wound or adjacent tissue at times with resultant sinus formation and suppuration, and in some instances by return of ankylosis, as reported by Osgood (Boston Med. and Surg. Jour., July 20, 1911), and in personal communications from three cases at St. Agnes' Hospital and Ashbury's observations, as well as the writer's own experience with its use.

The advantages claimed by Baer over the bulky muscle flap and fascia method is that the resultant articulation had a much more stable motion and there is a less waddling gait.

Thorn (Zeitschr. f. Chirurgie, bd. cviii, h. 3-4, s. 424) reported a traumatic ankylosis of the elbow in an eleven year old boy. He brought about a mobile joint and then interposed a free transplanted fascial flap from the thigh. Systematic mechanical treatment, movements and massage were used, and twelve months after the operation the elbow had good movement of 55°. Recently Hauer of Johns Hopkins Hospital had in an ankylosed elbow used a flap from the fascia lata of the patient's thigh with satisfactory results.

EMBRYOLOGY OF THE ARTICULATIONS

The embryology of the articulations is exhaustively covered in Murphy's article, to which those interested may refer, and but one or two points therein need be referred to at this time.

During fœtal development an indifferent connective tissue substance, according to Gegenbauer (Zur Morphologie der Gliedmassen der Wirbelthiere, Morphol., ii, 1876) appears between the ends of the primitive bones and this indifferent tissue soon becomes a cartilaginous plate of mesoblastic origin. This plate in turn splits or liquifies transversely into two cartilaginous plates with an interspace filled with a collagen or gelatin-like substance derived from a splitting of fat capsules, and forms a hygroma-bursa. (Langemak: Arch. klin. Chir., vol. lxx., No. 4, p. 946.) The interspace goes to form the joint cavity and the collagen the synovia. The cells lining the newly developed cavity appear as flattened endothelial cells; they are really transformed connective tissue cells.

In some joints (Gegenbaur), before the split occurs, the bone ends become covered with an articular cartilage and the intermediate substance becomes a continuous inter-articular disc with a special separated joint cavity on each side, or a discontinuous plate, as in the case of the semilunar cartilages with partially separated joint cavity.

EFFECT OF MUSCULAR ACTION UPON JOINTS

Fink (Ursachen der Knochenformen, 1857) considers muscular action all-important in forming the articular ends of bones, which he showed by dividing muscles in dogs and immobilizing the joints of growing dogs, in each instance changing the shape of the articulation. This would also be in line with the work of Julius Wolff, from whom we have the well-known "Wolff's Law," that "both the internal architecture and external conformation of bones are dependent upon *function* and function alone." (J. Wolff, Gesetz. der Trans., Knochen, Berlin, 1892.) This offers an encouraging prospect to us when we have to reshape the components of an ankylosed articulation.

Fink also considers the shape of the articular ends largely due to the degree of activity in the *circulation* of the components, that bone having the nutritional advantage from the blood stream will show hyperplasia or over-growth, and vice versa.

Henke and Reyber (Sitzung der K. K. Wiener Akademie, 1875, lxx) maintain that muscular *leverage* contributes largely in determining the shape of the articular ends.

ESSENTIALS IN FORMING A NEW JOINT

1. All surgeons are agreed that the ankylosis must be broken up, either by force or cutting asunder the components of the new

joints. We may further conclude from our own experiences, and that of our predecessors, that there must be an appreciable space between the bones composing the proposed articulation and that, except in those cases in which a simple agglutination has occurred between the synovial surfaces and no pronounced thickening of the synovial membrane or capsule or any necrosis of cartilage and bone has occurred, in all other cases reunion will unfailingly recur, with simple brisement force.

2. Everyone familiar with the subject will agree that after true fibrous or bony ankylosis is broken up *something* must be interposed between the opposing denuded surfaces and remain there until such time as the denuded surfaces have healed and will no longer re-adhere or grow together.

3. This "something" must be innocuous; of sufficient thickness and toughness to prevent contact between the opposing surfaces filling every nook and cranny in the proposed joint; it must be absorbable, but not absorbable with such rapidity that it disappears from the newly-formed articulation before all granulations have healed. A "something" is necessary that can be put into the newly-formed articulation in a liquid form to fill all crevices and that will rapidly congeal and harden, and when in liquid form would be at such a temperature that no scalding of the tissues would occur, and, at the same time, at body heat would not soften sufficiently to spread and allow contact between the bones.

This line of thought was pursued by the writer, and in May, when the investigation was begun, he felt that the solution of the problem probably lay in the utilization of the surgical waxes or gelatins combined with fatty substances, to imitate nature with its amyloids, colloids and fats. Some results in research concerning the behavior of the waxes and fats only will be reported at this time.

SUBSTANCES EMPLOYED

In any substance used for this purpose the beginning of the congealing point must be well below scalding point, 150° F. (65.5°C.), or it must be combined with such other adjuvant substances as to bring the melting and congealing points down, and at the same time not interfere with its ultimate absorbability and innocuousness.

The following substances, with their melting points, were considered and experimented with:

White wax	64–65° C.
Yellow wax	62–64° C.
Japan wax	54° C.
Myrica wax	45° C.
Lard	40° C.
Tallow	45° C.
Lanolin	37° C.
Cocoa Butter	37° C.

Gelatin begins to congeal at 40° C. and above that point is liquid. Thirty minutes after the withdrawal of this temperature it is hard and solid.

Spermaceti was not considered favorably in the experiments, as it becomes rancid so rapidly, and unsafe. Paraffin, 74° to 76° C., and paraffin mollis, 40° to 42° C., were discarded as insoluble and non-absorbable. Vaselin was also cast aside for the same reason, as an ingredient in any proposed arthritic wax.

ANIMAL EXPERIMENTATION

As no substance absorbed in less than four to six weeks would be of value, this point had to be investigated. To determine the rapidity of absorption of any proposed substance, rabbits were used, after the usual antiseptic preparation, and the substance was introduced, under cocaine anæsthesia, through a small incision subcutaneously by means of a glass urethral syringe, as a syringe with a nose was found undesirable from the fact that the wax would cool down too rapidly in passing through the nose of the syringe. The wound was closed with crepe lisse or cotton and collodion.

Rabbit No. 1. Injected subcutaneously with one drachm.

White wax...1
Lanolin....40 Melting point, 100° F.

Result — Absorbed in ten days.

Rabbit No. 2. Subcutaneous injection of one drachm.

White wax. 1
Lanolin....30 Melting point, 102° F.

Result — Unabsorbed in two weeks; absorbed in three weeks.

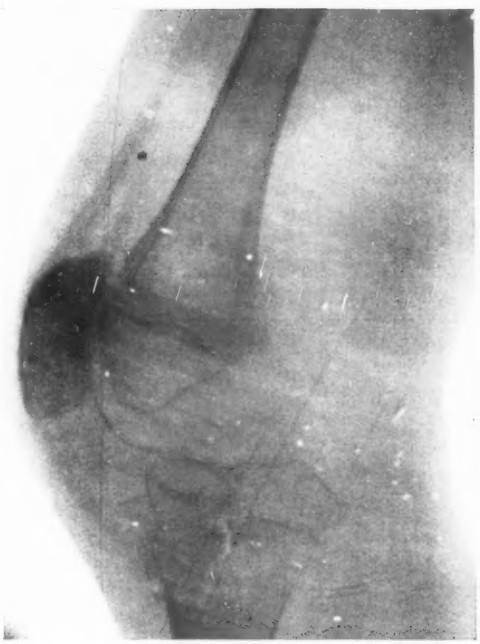


Fig. 1A. Infectious arthritis of knee before operation.

Fig. 1B. Infectious arthritis of knee, result of operation II.

Rabbit No. 3. Injected with same amount as others of

White wax. 1
Lanolin.... 15 Melting point, 105° F.

Palpable for three weeks.

Rabbit No. 4. Injected with two drachms of

White wax.. 1
Lanolin.... 10 Melting point, 107° F.

Palpable three weeks.

Rabbit No. 5. Similarly treated with

White wax.. 1
Lanolin.... 6 Melting point, 110° F.

Palpable for four weeks.

Rabbit No. 6. The same, with

White wax.. 1
Lanolin.... 3 Melting point, 115° F.

Half absorbed in four weeks.

Rabbit No. 7. The same, with

White wax.. 1
Lanolin.... 1.5 Melting point, about 125° F.

Not entirely absorbed in six weeks.

Similar determinations were made with yellow wax and tallow, and yellow wax, tallow and castor oil, the latter to secure more cohesion and lower melting point. In some mixtures bismuth was added solely for radiographic purposes.

OPERATION I

Rabbit No. 9. Under ether and morphia anæsthesia the left front leg was opened with strict asepsis at the elbow, and the entire articulating surfaces were removed from the humerus and ulna down to the bone, so that with fixation and without the interposition of any substance, experimental ankylosis would result under ordinary circumstances. In this instance arthritic wax, composed of yellow wax 1, lanolin 5, was interposed, the capsule and synovial membrane and skin were sutured and the wound sealed with collodion. The limb was splinted and strapped to the thorax for two weeks, when it was found the wound had healed *per primam* and there was no tendency to adhesions, and there was free motion in the joint. At the present time, three months after the operation, the rabbit has good use of the joint and free movement in it.

OPERATION II

B. L., aged 9 years, white, female.

Diagnosis. Infectious osteo-arthritis ("Rheumatoid Arthritis").

Family history. Father died of pneumonia. Four brothers and sisters died, cause unknown. Mother and five sisters living and well; otherwise negative.

Fig. 2. Infectious arthritis of knee after operation III. Containing yellow wax, tallow, castor oil and bismuth.

Past history. Has had measles and scarlet fever; no other sickness.

Present illness. Began in 1909, following scarlet fever, with swollen joints which were very painful. No redness, no sweats, slight fever at times. Swelling began in left ankle; later left wrist became involved. Shortly after, patient had swelling in both knees and both elbows, which gradually grew worse.

Physical examination. On patient's admission it was noticed that she was fairly well nourished but anæmic and hyperaesthetic. Pupils react to both light and accommodation. Mucous membrane fair color. Breath fetid. Two carious teeth and two alveolar abscesses shown in X-ray. Tonsils normal; throat well formed, expansion good. Lungs clear throughout on percussion and auscultation. Heart not enlarged. Slight precordial heaving. No thrill. At apex a blowing systolic murmur is audible, heard over whole heart area. Abodmen: Negative to abnormalities. Extremities: Both knees ankylosed and flexed 30°. Patella adherent and immobile. Ankles partly ankylosed; very painful on slight manipulation. Little swelling, local temperature not elevated. Hip-joints negative. Upper extermities: Shoulder-joints negative. Both elbows nearly completely ankylosed. Left has about 20° of motion and right about 10°. Both wrists slightly swollen and painful on manipulation, as well as the carpo-metacarpal articulations. Slight ankylosis in both regions. Metacarpo-phalangeal joints are involved, as is second joint on middle finger of right hand. Spine is partly ankylosed in cervical and upper dorsal vertebræ. It was determined to try to give mobility to the right knee.

OPERATIVE TECHNIQUE

After the usual most scrupulous preparation, two incisions were made, one on each side of the patella, about 8 cm. long, extending through the skin, fascia and adipose tissue down to the thickened capsular ligament, the latter being opened, as was also the remains of the synovial membrane, now fibrous tissue. It was found that both surfaces of the membrane adhered and contained no synovial fluid, save a small pocket just above the patella. Bony ankylosis was found between the femur, tibia and patella on each side. By means of an osteotome and periosteal elevator the anklyosis was broken up, after which the necrosed bone was curetted away at the eroded points, and also the diseased cartilage. No attempt was made to remove enough bone and remaining cartilage to permit of normal range of motion. The leg was flexed at an angle of about 45° and the bones pulled apart as far as possible, after which the articulation was filled with a mixture of wax, 1, lanolin, 5, cooled down to about 108°, an abundant supply being put between the patella and femur, after which the joint was held at an angle of 45° until paste hardened, when the synovial membrane was sutured (also capsular ligament) with continuous silver wire. The wax mixture was sterilized in a covered agate jar previously melted and brought to the operating table in a water-bath at the time of injection. A sterile thermometer was put in the wax and a second thermometer in the hot water. Injection was made with an urethral syringe, the temperature being also tested on the operator's arm.

After suturing the skin subcuticularly with silver wire, the wound was covered with silver foil and proper dressings and the leg put up in a plaster-of-paris cast, at an angle of 45°. This cast was allowed to stay on for one week, then taken off and the leg manipulated under anæsthesia, after which patient was put up in traction. At the end of the

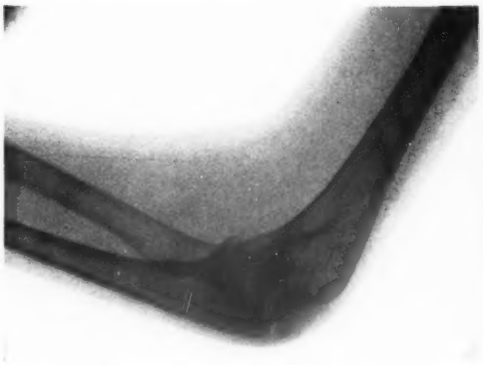


Fig. 3. Infectious arthritis of elbow, 10° of motion (Case B. L.).

second week, primary healing having occurred, all dressings were removed and extended manipulation attempted, but this was too painful, so at the end of the third week the patient was anæsthetized the second time and knee manipulated, it being found that there were only about 35° of motion, but the patella was freely movable and the limitation of motion between femur and tibia was due to malformation, and transformation of the articular ends of the bones, and not to adhesions.

As this was not satisfactory, except in regard to the patella, and much of the limitation of motion was due to bone malformation, the previously thickened capsular ligament and close apposition of the bones not permitting enough wax to intervene, it was determined to reopen the joint, correct these errors, obtain free movement of the bones upon each other by sufficient excision, and to use a harder wax.

OPERATION III

On same joint, the right knee, an incision was made on inner aspect of the line of the scar of the previous operation, exposing the inner side of joint. The patella was found to be freely movable. On manipulation of the joint a small amount of wax preparation could be squeezed out of the deeper portion of joint cavity. A greater part of the wax preparation that had been injected during the previous operation had been absorbed.

Fig. 4. Alveolar abscess in case of infectious arthritis (B. L.).

Some of the articular cartilage of both femur and tibia had been removed at the previous operation, but these bones were in too close apposition when joint was opened the second time to permit of any marked degree of motion.

There had been apparently some regeneration on the part of the femur; both the external and internal eroded condyles were found to have incapsulated in them the paste mixture which was injected at the previous operation; otherwise there were slight signs of regeneration.

A second incision was made on the inner side of knee, similar to one on outer side, and the entire knee joint exposed, after which a large portion of articular surface of the internal and external condyle was chiseled and curetted away, also a small portion of the articular surface of the tibia, leaving a gap

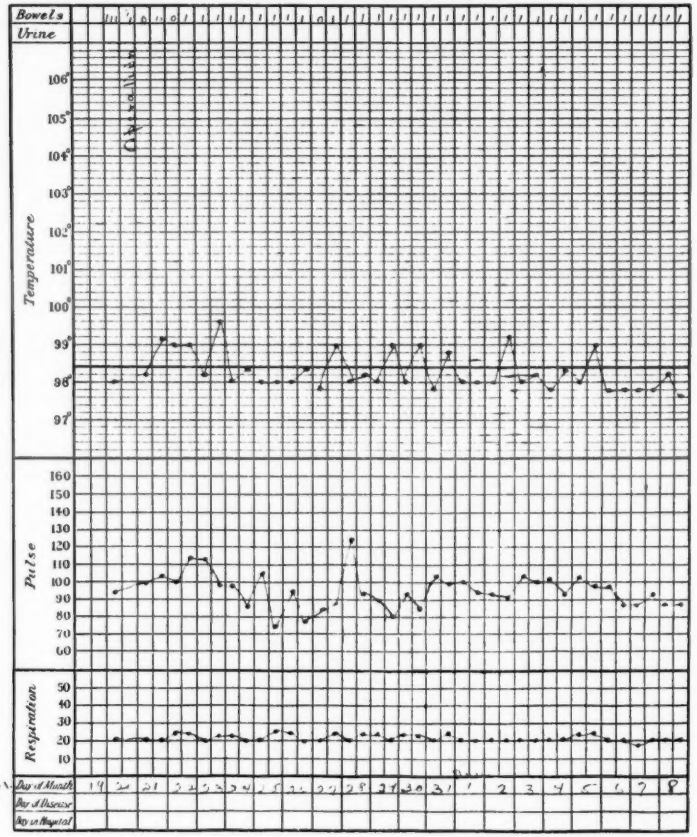
HOSPITAL FOR CRIPPLED AND DEFORMED CHILDREN

Service Orthopaedic Ward ____ No. ____

Prof. Taylor Name Ruth McCook Occupation School Girl Age 17

Dr. Dane Diagnosis Tubercular Knee + Ankylosis.

Date Oct 19 - 11



HOSPITAL FOR CRIPPLED AND DEFORMED CHILDREN

Service Orthopaedic Ward Girls No. ____

Prof. Taylor Name Bridget-Lyng Occupation School Girl Age 10 yrs

Dr. Dane Diagnosis Caries of Ankle

Date Aug 31 - 11

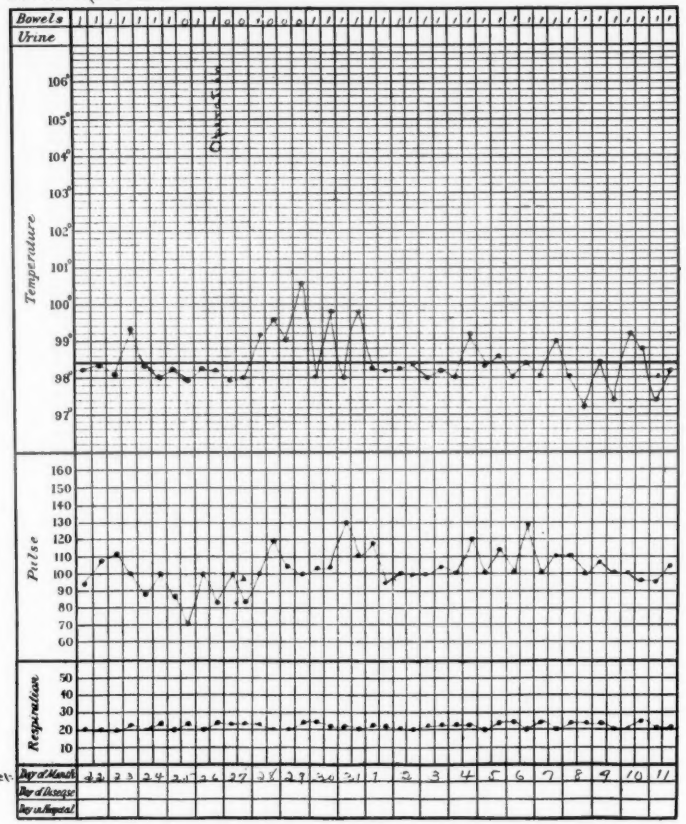


Fig. 5. Tubercular osteitis of knee, (Case R. M.,) before ankylosis.

Fig. 6. Tubercular osteitis of knee, showing bony ankylosis between patella and femur, and tibia and femur. (Case R. M., lateral view.)

of over 1 cm. on both inner and outer margins of joint. A large part of the capsular ligament was also cut away, but the crucial and lateral ligaments were preserved. The joint cavity was then filled with paste preparation, which filled every part of joint, as it was injected as a liquid. The paste consisted of the following proportions: Yellow wax, 1 part; mutton tallow, 2 parts; castor oil, 2 parts, with 15 grains to the ounce, by weight, of the mixture of bismuth subnitrate. This arthritic wax melts at 140° F. (60° C.) and is semi-solid and begins to congeal at 128° (53° C.). The mixture should be drawn up in the syringe again and again to get a uniform suspension of the bismuth, and for cooling purposes.

The leg was held in full extension with traction while the paste was injected and remained in that position while the paste was hardening, after which the wound was closed with silver wire, etc. The leg was put up in full extension by means of plaster of paris. At the end of ten days the cast was taken off and the leg manipulated, and it was found to have good motion and no adhesions. The leg was put up in extension by means of traction, a 5-lb. weight being used, and the patient encouraged to move the joint actively several times each day. Three weeks after the second operation patient has between 40° and 50° of voluntary flexion with little pain, and the remaining motion is simply restricted by voluntary muscular contraction.

OPERATION IV

R. M., aged 17, white girl.

Diagnosis. Tuberculosis of the right knee, which is ankylosed firmly in full extension.

Family history. Father died of phthisis. Mother living and well. One brother, two sisters, living and well. With exception of father, no other history of tuberculosis. No history of joint or nervous diseases; no malignancy.

Past history. Always healthy, except tumor albus (in 1900). Birth normal. Walked and talked at two years of age. No history of measles mumps, whooping-cough or diphtheria. No tonsil-

Fig. 7. Tubercular osteitis of knee, (Case R. M.,) after ankylosis; anterior-posterior view.

Fig. 8. Tubercular osteitis of knee, (Case R. M..) after operation, containing yellow wax, lanolin, cocoa-butter and bismuth.

litis. Patient is subject to bronchitis. Gastro-intestinal and genito-urinary diseases negative.

Present illness. In 1900 patient had tuberculosis of right knee, which was treated, in the best environment, by bed traction and later by plaster fixation. It became ankylosed. Now no acute symptoms for several years.

Physical examination. Well nourished. Skin good color; tongue slightly coated. Lips and mucous membrane good color. No pain on mastoid pressure. No tophi. Eyes react to light and accommodation. Few cervical glands palpable. Thorax well formed. Inspection, palpation, percussion and auscultation show no pathological changes in heart and lungs. Abdomen negative. Extremities normal, with exception of right knee, which is completely ankylosed in extension.

Operation. A longitudinal incision about 10 cm. in length was made over anterior aspect of right knee, just to outer side of patella, and the joint readily exposed. The prepatella bursa contained a rather large amount of yellowish, caseous material which was curetted out before attempting to open the joint. The joint capsule was definitely thickened and there was a fair amount of granulation tissue about the same. This was cut away, as was the capsule, as far as possible. There was definite bony ankylosis of the joint of a marked eburnated character and this was more marked on the external portions. The patella was ossified to the femur firmly. The character of the bone in this case was in marked contrast to the preceding case, in which the articular ends of the bones could be easily removed with a curette to the depth of 0.5 cm. It was first freed by osteotomy, and showed marked pathological changes, having more or less a worm-eaten appearance, and the articular portion was easily ronguered away. An attempt was then made to render the joint movable, which was accomplished by chiseling away the articular portion of the external condyle of the femur and also a large portion of the articular surface of the tibia. At this time the knee could be flexed to almost 90°. After drying the wound thoroughly the cavity was filled with wax preparation consisting of the following proportions: yellow wax, 1 part; cocoa-butter, 2; lanolin, 2; 15 grains of bismuth to the ounce of mixture. Melting point 130° F. The wound was closed with silver wire, silver foil and dry dressings. The leg and

foot were put up in a plaster cast in a position of full extension.

Four days after the operation the cast was taken off and the leg held in extension by traction, ten pounds being used. At this time the leg was slightly manipulated and found to be free from adhesions. On the tenth day after the operation the dressings were removed and the wound found to be healed, save a small part of the incision at the lower end where the silver wire suture broke. Leg was manipulated under anæsthesia and no adhesions found. Since then it has not been necessary to give an anæsthetic to manipulate the leg, as *the patient has been daily giving her joint frequent* active and passive movements. On the fifteenth day patient was allowed to walk on leg, she being able to flex the leg on thigh. Now, one month after the operation, the patient has voluntary flexion of about 60°.

The X-rays of these cases show the condition of the joints before and after the introduction of the wax.

Two especial points the writer wishes to call attention to in this method, and these are the entire absence of fever resulting from the unirritating nature of the interposed substance, nature tolerating it well. Second, voluntary active motion is soon possible, as it is practically painless and the range of motion, if sufficient fibrous and osseous tissue is removed at the time of the operation, should approximate normal limits as soon as the involuntary muscular rigidity from the patient's timidity will permit. The reformation of adhesions have not thus far been demonstrable, even under anæsthesia.

Lanolin, 2 parts, and wax, 1 part, forms a smoother articular wax than when combined with other substances and less likely to form hard lumpy masses under the skin incision. The mistake should not be made of putting too much wax into the joint, only sufficient being used to separate the eroded surfaces.

Final judgment or conclusions cannot be formed at this time, but the outlook is encouraging, which, however, a later paper will report upon.

The use of bone wax or "antiseptic wax," composed of oil of sesame, 30; spermaceti, 30; and iodoform, 40 parts, melting at 50° C. (Simmons, Annals of Surgery, Jan., 1911), has been extensively employed to fill bone cavities resulting from acute osteomyelitis by Mosetig-Moorhof (Wien. klin. Woch., 1903), Silbermark (Deut. Zeit. für Chir., lxvi, p. 589, 1904), Jones (Lancet, i, p. 146, 1905), Moore (Jour. A. M. A., xliv, p. 1582, 1905), and others, but so far as the writer has been able to discover it has never been employed for stereo-arthrolysis nor reported in the literature. Mosetig-Moorhof used his wax after the excision of the acute tubercular arthritis for its antiseptic value.

Prescott Le Breton (Am. Jour. Orth. Surg., May, 1910, p. 467) suggests that the addition of white wax to Beck's bismuth paste, to get a firmer consistency, "would make these agents more valuable where they are employed in other fields of surgery, e. g., the prevention of peritoneal adhesions in tendon or nerve grafting, and for injection into joints after breaking up of fibrous ankylosis."

R. T. Morris (Surg., Gynecol., and Obstet., xii, p. 595, 1911) reports the use of "artificial synovial fluid" for "dry, creaky joints," but not, of course, for ankylosis. This fluid is injected by hyperdermic into the synovial cavity in quantities varying from one drop for the fingers to half an ounce or more, depending upon the size of the joint. The fluid consists of boroglyceride, 1; glycerine, 3; water, 4, and salt to make a strength of .9 of one per cent, or about four and one third grains to the ounce. He states that one injection is, as a rule, sufficient, and that even after freshly broken up agglutinations in the synovial cavity an injection produces comfort. Pain is the exception.

In conclusion, the writer wishes to express his thanks to Walter S. Niblett, who has been untiring in assisting with the various experiments and operations; and to my other assistants, William Neill, Jr., and Arthur Valk, for their hearty coöperation. Dr. H. E. Ashbury has been most kind in the matter of the X-rays and in interest, and Dr. H. A. B. Dunning, of Hyhson, Westcott & Company, chemists, has been helpful in his branch.

THE OPERATIVE TREATMENT OF FRACTURES[1]

By JOSEPH A. BLAKE, M. D., New York City

ONE has only to read the articles that have appeared during the past year to appreciate the widespread interest that exists in the treatment of fractures by open operation. Almost without exception, the writers seem to have taken the stand that fracture patients should not suffer from too close adherence to inherited customs or dicta, and that they should benefit with the rest, from the advances of aseptic surgery. The statements as to the indications for operative treatment, as a rule, have been sound and conservative, and few have had the temerity to advise operations for all cases. Briefly stated, the consensus of opinion seems to me to be that a cutting operation is indicated when there exists a strong probability that a good functional result will not be obtained otherwise. This view is the one I myself have arrived at by a sort of evolutionary process.

My first operations were for non-union. Gradually the scope of the indications came to include irreducible fractures in which the chances of non-union were great, or in which if union was attained there would be in all probability loss of function. Naturally the scope grew still further to include fractures which, although reducible, could not, for one reason or another be retained in position. As experience became greater, conviction became stronger as to the outcome in any given case, and when the result seemed sufficiently dubious, the surer operative method was carried out. As to what constitutes a reasonable doubt as to the ultimate results from non-operative treatment, depends so much upon the thousand and one conditions that may be present in the patient and also upon the ability of the surgeon to meet them, that it is practically impossible to state in so many words what fractures should be treated without, and what by operation.

Again, one surgeon may be able to do rapidly, accurately and cleanly what would be practically impossible for another; so that there are considerations to be taken into account other than the conditions present in the patient. In fact, there is no province of surgery in which the results depend more upon the mechanical skill and cleanliness of the operator.

This paper is based upon 106 operations of mine of which I have complete records. For obvious reasons, operations for compound fractures are not included. Also operations for fractures entering joints in which the operation was done for ankylosis or removal of fragments are not included. Of the 106 cases, 5 were for fractures of the clavicle, 8 for fractures of the humerus; 5 for fractures of the olecranon; 17 for fractures of the radius and ulna; 21 for fractures of the femur; 43 for fractures of the patella, and 7 for fractures of the tibia and fibula.

The methods of internal fixation were various: In some dependence was placed upon the inequalities of the ends of the fragments; in others, chromic gut, copper, bronze or silver wire, nails, screws, dowels, pins, or plates were used; and, I may say, I still use all of these with the exception of medullary dowels. I have always believed that the less non-absorbable foreign material used the better, and my next preference to nothing is chromicized gut, and I prefer a single screw to a plate and eight screws. Even as the indications for operation vary so do those for the method of internal fixation. The amount of internal fixation depends upon whether it is only necessary to steady the fragments until the external fixation is applied, or whether it is to be subjected to violent strains as may happen, for instance, in some fractures of the femur. It has been amply proven by experimental and clinical evidence, that a constant strain will loosen the strongest forms of internal fixation. Just as a suture drawn too tight will produce absorption and cut the soft parts, so will a constant strain draw the

[1] Read before the Clinical Congress of Surgeons of North America, Philadelphia, November 13, 1911. See discussion, page 400.

screws of a plate no matter how well introduced. The point I wish to make is that we have to rely chiefly upon external dressings; the function of the internal fixation being to obviate motions or displacements which may be caused by muscular action, or by sudden strains, such as may happen during the application or change of external splints or dressings. One of the chief advantages of internal fixation is the possibility of early and frequent passive motion of neighboring joints without endangering union.

The occurrence of non-union is not so very rare, even when the fragments have been maintained in end to end position by ordinary external splints. I have seen such results notably in the femur. I have also seen non-union occur when the femur had been wired. In these cases non-union has usually been attributed to the presence of the wire. When, however, the wire was changed for a plate which kept the fragments rigidly fixed, union resulted in spite of the presence of much more foreign material.

The question as to the effects produced by metallic substances upon the nutrition and growth of bone seems to me to be still undecided. In my experience the only metallic substances that have seemed to produce irritation under aseptic conditions have been those consisting partly or wholly of copper. In one patient I removed a bronze wire after it had been in the ulna for two years; in another, after it had been in the clavicle for one year. The skin over the first was unchanged, but it lay in a bed of serum and soft granulations; in the second instance a sinus had formed. In another case an encircling copper wire amputated a femur one year after it had been introduced. Two encircling wires had been put about the three oblique fragments. During the year considerable enlargement of the bone had occurred, whether from excessive reparative action, or not, it is difficult to say. Both wires were in channels lined with granulations; and at one of them a spontaneous fracture occurred. (Figs. 1 and 2.) In one of my earlier plating operations I used a brass plate because I was in a hurry and could get no other material from which to make a plate. (In those days I made my own plates.) In this case a slow infection developed, after ten days of what seemed an aseptic course. The plate was removed on the 25th day; soft union was present and later became firm. Whether the late infection was accentuated by the presence of the brass, is a question.

Mild infections apparently do not interfere with union, but, on the other hand, seem to stimulate the formation of callous. Infections severe enough to cause necrosis of tissue manifestly will prevent union.

In my series there were three mild infections; all in operations upon the femur. A rather excessive production of callous was present in all, and union did not seem to be delayed, but even seemed to be accentuated. By this statement I do not wish to appear to make light of infection, for it must be considered the worst misfortune that can happen in operations for fractures.

A beautiful illustration of the result of infection is shown in Figs. 3 and 4. This patient was admitted to the Presbyterian Hospital five days ago in extreme sepsis, with a history of operation for a fracture six weeks before. The arm was a bag of pus which was draining imperfectly from a large sluggishly granulating wound. The white ends of the fragments could be seen in the wound. The radiograph (Fig. 3) showed very distinctly that the dead ends had separated, and with a little force they were pulled off the fragments. It is interesting to note that the line of separation formed at the holes that had been drilled through the fragments for the introduction of a suture.

Infection must be eliminated if good results are to be expected, and if one cannot operate with absolute faith in his technique, he should not operate on fractures.

It seems to me that the greatest improvement toward the avoidance of infection has come with the use of powerful forceps for controlling and reducing the fragments. In my hands they have shortened the time to about one-third of what used to be consumed in an operation. By their use reduction can be accomplished with far less injury to the soft parts; the fingers and hands do not have to be inserted into the wound, and plates and

Fig. 1. Radiograph of comminuted oblique fracture of femur in a woman 68 years of age, three months after operation, in which a screw, two wires and a plate were used.

fragments are held absolutely fixed while the screws are introduced, thus causing every screw to have a similar bearing, and consequently all to hold in the same direction at once. It is a principle well known to all mechanics that to get the full holding benefit from screws the substances to be fastened together must be rigidly clamped in position when the screws are being introduced. If this is not done, the strain of one screw may be even exerted against another; and, if an external strain or stress is applied, one will give away after another, just as the threads do when a piece of cloth is ripped.

My first plating operations were done seven years ago. The plates I used were faulty in principle, being wide and concaved from side to side to fit the convexity of the bone. I only used them for fractures of the femur, and recognizing the strain they would be put to, made them in this shape to give them the requisite strength and also to allow the screws to be toed in; for I could not obtain screws threaded to the heads with a coarse thread. I made several plates of silver, and one of steel besides the brass one I have already alluded to. In order to thread the screws to the head, I had them made on the lathe because I could not get machine screws with coarse enough threads. I was cogitating on how to get wood screws threaded to the head, when I obtained some of Lane's. These, with his narrow reinforced steel plates, solved the problem. It only remains now to get reliable plates made of the best tool steel, properly tempered and annealed. I think they should be annealed to a dark blue, thus making them to be a little softer than an ordinary spring temper.

My variations from Lane's technique have been in the use of the Lambotte clamps, with which I reduce the fracture, and then hold the plate in place while it is screwed on. (Fig. 5.) I find that with these clamps I no longer have to use traction for reducing fractures; for even in old fractures of the femur with overlapping, the fragments held in the clamps can be angulated out of the wound, and the ends held in position while the limb is again straightened, reduction being accomplished rapidly and easily with a minimum of traumatism. In fractures of smaller bones such as those of the forearm, if the clamps are put on close to the ends of the fragments and then one clamp grasped in each hand, by crowding the knuckles together, a tremendous amount of steady force can be applied and any fracture reduced without a jump or a slip.

I have been using these clamps for the past two years, and all my plating operations during that time have been done with them and Lane's plates. I now would hesitate to operate on a fracture, unless I had them, whether I expected to plate or not.

In these two years I have used seventeen Lane plates, and all with the exception of four, two of which were removed because of infection, and two for not holding, are still reposing quietly in their hosts.

Fig. 2. Radiograph of same fracture as shown in Fig. 1. One of the wires has produced absorption and spontaneous refracture.

A brief summary of my operations in groups is as follows:

Clavicle. There were five operations for fracture of the clavicle, three for irreducible fracture at or near the middle, the cause of the irreducibility being interposition of muscle; and two for fracture close to the mesal extremity which could not be retained in position. Three were sutured with chromic gut and two with bronze wire. There were no infections and union was obtained in all. In one fracture at the mesal extremity, the bronze wire was close under the skin and a sinus developed later and the wire was removed one year after the operation.

Humerus. I have records of only eight operations upon the humerus although I recollect several others. There were a number of operations for old and recent fractures entering the elbow and shoulder joints in which revision of the joint or excision of fragments were the only possible procedures and in which, therefore, no type method was employed and they are, consequently, not reported.

Of the eight operations six were done for irreducibility, and two for non-union. Four were sutured with chromicized gut, including one of the cases of non-union; one with silver wire and one with copper wire. Two were plated with Lane plates. Bony union was obtained in all and there were no infections with the exception of a plating for a compound fracture containing clothing and earth. The infection in this patient was very mild, the plate being left in for six weeks, when it was removed on account of a persisting sinus. The screws were loose. This case is included to show that a plate is of distinct value although there is probability of infection and subsequent removal. In this case I could not keep the fragments together with a gut suture, which I consider preferable to any metallic substance for compound fractures when there is probability of infection and suppuration.

Olecranon. There were five operations for fracture of the olecranon, one by Dr. McWilliams. One was of four months standing, and was complicated by an anterior dislocation of both radius and ulna. The others were recent. Three were done with lateral sutures of chromic gut, and the one by Dr. McWilliams by circular wiring through the fragments. The results in all were perfect.

Radius and ulna. There were seventeen operations for fracture of the radius and ulna, exclusive of those for fracture of the neck of the radius and revisions of malunited fractures of its distal extremity. In fifteen of the seventeen both bones were broken; in the remaining two the radius alone was fractured and repeated ineffectual attempts at reduction over a period of two weeks had been made. Of the fifteen fractures of both bones, eleven were operated upon because of irreducibility and four for non-union. It is safe to say that all were irreducible, for the ununited fractures had not been reduced. In six both bones were operated upon; in nine it

Fig. 3. Radiograph of a humerus six weeks after a wiring operation for an infected compound fracture. Sequestra in place.

was only necessary to cut down upon one bone, the fracture of the other being an incomplete or reducible one. In five cases no internal fixation was found to be necessary, the irregularities of the ends of the fragments being sufficient to retain the position when accurately reduced. In five chromic gut sutures were used; in three phosphor bronze wire and in one silver wire. In three cases Lane plates were used, in two on both bones, in one on the radius alone. There were no infections and bony union was obtained in all. The functional results in all were excellent. In one plating operation on both bones there is some bowing of the ulna, but three-fourths of pronation and supination is present. In one case a phosphor-bronze wire was removed from the ulna two years after operation, it being superficial beneath the skin and causing irritation. It was loose in the bone, being surrounded by granulations.

My feeling in regard to these fractures is that far more should be operated upon than is customary. This is especially so of fractures of the proximal portion of the shaft of the radius, where mesal bowing of the fragments is extremely difficult to prevent by external splints. One ineffectual attempt to reduce under an anæsthetic is a sufficient indication for operation. Repeated attempts cause more traumatism than an open operation; and operations on these bones can be carried out safely and with less liability to infection than is the case in most fractures elsewhere. Furthermore, most of them, particularly those occurring in childhood, can be retained in position, if they are perfectly reduced, without any internal fixation, on account of the sharp irregularities of the ends; and, when internal fixation is necessary a chromicized gut or kangaroo tendon suture usually suffices. Plates will seldom be found necessary and only in those cases in which there is a marked tendency to angulation, which probably cannot be prevented by external splints.

Femur. There were twenty-one operations for fracture of the femur; twenty for fractures of the shaft on eighteen patients, two being operated upon twice; and one for an ununited fracture of the neck.

The ages of the patients varied from five to sixty-eight years.

There were twelve typical plating operations; nine with Lane's plates, one with a steel plate four inches long, one inch wide, one with a brass plate and one with a silver

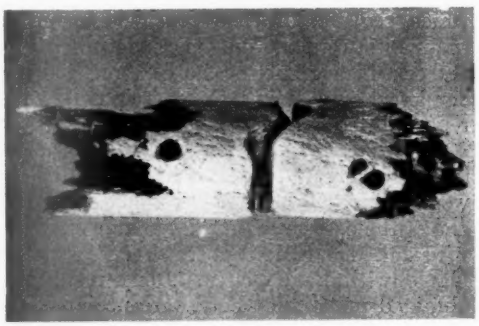


Fig. 4. Sequestra removed six weeks after a wiring of an infected compound fracture of the humerus. Same case as in Fig. 3.

plate of the same size; in one operation a silver plate was fastened on with circumferential wires, the faulty screws not holding; in one comminuted oblique fracture, a small plate, two wires and a screw were used; in one oblique fracture a nail was used, being withdrawn later by a wire that had been left attached to its head and protruding through the wound; in three operations for oblique fractures single screws were used; in two operations medullary dowels were used, one of bone (sheep's tibia), one of aluminum; and in one patient wire alone was used.

The indications for operation upon the fractures of the shaft were: non-union in nine, vicious union in six, irreducibility or inability to retain in position in five. The single operation for fracture of the neck was for non-union in a man aged twenty-five years.

Primary union of the soft parts took place in seventeen of the twenty-one operations. Of the four infections, two were in the earlier plated cases in which the operations were long and much traumatism was inflicted. The plates also were clumsy. One was of steel, the other of brass. This last case has already been alluded to. Both of these infections were mild and union occurred before the plates were removed. The third infection was unexplained. It happened in the case of a boy eight years of age, plated with a Lane plate two days after the injury. The plate was removed seven weeks after operation. Union was delayed but the ultimate result was excellent. In the remaining case of infection the result was not so fortunate. The infection was a severe streptococcus one and resulted in osteomyelitis and eventual disarticulation at the hip. The patient recovered. The result in this case can be charged up to faulty judgment with as much propriety as to faulty technique. The patient, a child five years of age, had been run over

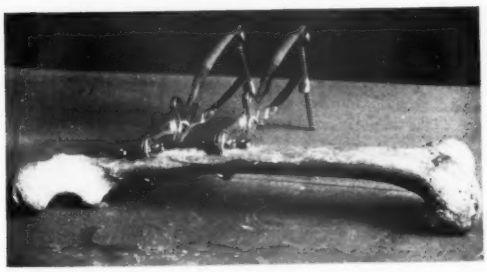


Fig. 5. Lambotte clamps holding Lane plate in place. The screws are introduced before the clamps are removed.

Fig. 6. Fig. 7.

Figs. 6 and 7. Radiographs of plated transverse fracture of the femur in a girl 7 years of age, nine months after operation.

Fig. 8. Radiograph four years after a wiring operation for a malunited transverse fracture in a boy 6 years of age. Operation was done seven weeks after the injury because of angulation and shortening.

by an automobile and had suffered a fracture at the middle of the femur, a rupture of the ligamentum patellæ and a separation of about one-half of the skin of the leg. She was treated tentatively. The leg was infected and a greater part of the skin from the knee to the ankle sloughed off. In the meantime, the femur united at a marked angle because of the impossibility of applying proper fixation. The operation, division of the fracture and plating with a Lane plate, was done in the presence of an apparently clean, although extensive granulating wound, reaching from the knee to the ankle; but no doubt virulent streptococci were present and the field of operation was contaminated.

In two patients, both plated with Lane plates, although there was no infection, the plates did not hold. The screws at one end of the plate drew, probably because of improper external fixation, resulting in one case in union with marked angulation, in the other in non-union. Both were replated with perfect result.

The ultimate result as regards union and function was excellent in all cases with the exception of the one that came to amputation and one other, already mentioned, in which an encircling copper wire caused absorption and spontaneous fracture one year after operation. (Figs. 1 and 2.)

My present attitude in regard to operations for fracture of the shaft of the femur is that all should be plated that cannot be reduced and retained in reduction. A moderate amount of displacement is permissible in oblique fractures; but, to my mind, in transverse fractures, reduction without over-lapping, is a prerequisite to non-operative treatment. Since union usually takes place in children and since in them accommodation to deformity is more perfect, more displacement is allowable without recourse to operation.

In regard to closure of the wound in the soft parts in these operations, I always approximate the structures accurately but very loosely with as few interrupted sutures of catgut as possible. The skin is united with interrupted sutures of silkworm gut placed about an inch apart, the idea being to permit drainage between the sutures. It is suicidal, or rather, homicidal, to use drains when plates or other non-absorbable materials are used.

Patella. I have records of forty-three operations for fracture of the patella, and I am positive that there are several more that have been missed in the search of the hospital records. Twenty-six were reported by me in a paper read at the meeting of the American Medical Association in 1904. All of my cases, with the exception of two of my earlier ones, have been operated upon by the method I described in that paper; namely, by suture with chromicized gut of the tears in the aponeurosis lateral to the patella. This method has been found rapid, safe and effect-

ual. No infections, bony union and complete restoration of function have been obtained in all cases.

Tibia and fibula. Of the seven operations for fracture of the tibia and fibula, four were for non-union, two for vicious union, and one for a recent fracture of the tibia involving the knee. Four were wired, two were sutured with chromicized catgut. In one no fixation was employed. No plates were used.

Bony union was obtained in all. No infections occurred.

ESTHIOMÈNE AND SECONDARY ELEPHANTIASIS VULVÆ

(Ulcus Vulvæ Indurativum Œdematosum)[1]

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DURING recent years publications upon the condition forming the subject of this paper have been very few. This is probably due to the fact that our knowledge of maladies of the vulva is growing clearer, and we can distinguish ulcerative, tubercular, or luetic processes from those of an indeterminable etiology. Under the latter heading there is a small group of diseases, better perhaps, a clinical picture to which we can apply no better appellation than that of esthiomène. This term was employed for the first time about sixty years ago by Huguier. He, like his contemporaries, knew no methods of differentiation among luetic, tubercular and simple ulcers of the external female genitalia. Chronic inflammatory processes due to chemical and other non-specific agents could not be separated from those caused by specific organisms. It is possible, however, to reopen this question and to analyze it more accurately, since our conception of the nature of syphilis and tuberculosis is no longer as vague as in the days of Huguier. The abused expression "esthiomène"[2] can be limited in its significance to a valuable term in the medical vocabulary, and with a bearing upon this purpose we beg to present the following case:

The patient, Mrs. A. R., 33 years old, of German parentage, has been married thirteen years. Family history negative; save for measles and diphtheria, patient was always well during her childhood. She has never been pregnant. About three years after marriage her husband acquired what appeared to be gonorrhea, was treated by injections and, according to his own story, completely cured. He denies any other infection, had no eruption and never received mercurial treatment.

Shortly after husband's infection, the patient noticed a painful discharge from the rectum. (We are following the patient's own history, which is absolutely trustworthy.) This secretion increased in quantity and at the same time pain, with occasional bleeding during defecation, appeared. The patient was treated at the time for hæmorrhoids and the condition improved, but was never entirely cured.

About six years ago she observed a painless swelling about the anus. She went from dispensary to dispensary, consulted physician after physician without benefit. The treatments usually consisted in irrigations and the use of mercury ointment and iodides. This continued for six or eight months. Growing discouraged at the failure of improvement she discontinued treatment, but the external genitals gradually grew larger and harder and have remained thus for the past two or three years. The menstrual history is negative. There was never any pain upon micturition.

The patient still complains of occasional pain during defecation, but it is less pronounced than at the beginning of the disease, while a constant secretion from the rectum continues to cause her great annoyance.

[2] From the Greek ἐσθίω = I eat.

[1] Read before the Section of Obstetrics and Gynecology, New York Academy of Medicine, October 26, 1911.

Status præsens. The patient is rather anæmic, of medium height and pretty well developed. The examination of the skin is negative. The glands are not enlarged. Eyes, nose and ears are negative. The teeth are in fair condition. The internal organs are negative, as are also the extremities. As the curious lesions presented certain changes after therapy, a description of them must be given under two heads, the first being referable to the condition in May, 1911, when the patient was first seen, and the second to the condition at the present time. The lesions involved an area extending from the mons veneris over the larger labia backward to about an inch behind the anus, and laterally for about two inches to either side of the intergluteal fold and over the glutei. Those over the mons and larger labia were different from the others. The former consisted of pale yellowish to orange-colored macules, papules and cysts, varying in size from a pinhead to a kidney bean, isolated or grouped, and those mentioned as cystic contained a limpid alkaline fluid. The more anterior ones were flatter and smaller than those lying over the posterior part of the labia. Those about the anus and in its imme-

diate vicinity were fleshy, an inch or more in length, so closely crowded as to mould each other by pressure. Here there were no cysts. No tenderness was found, and all the lesions were hard. Here and there a superficial ulceration was visible, but possessed no characteristic type. The labia were equal in size, enlarged, and in shape resembled a cucumber. They were easily movable, painless and not tender. The distribution of the lesions can best be understood by consulting the accompanying illustration. There it will be observed that the mons veneris is studded with small tumors; the right labium is covered from the upper inner to the lower outer aspect. On the left labium, the growths are more numerous also extending from the upper inner to the lower outer aspect. The swelling of both labia was so large as to cover the introitus vaginæ. On separating the greater labia, the labia minora seem to be normal in size and consistency. Only the preputium clitoridis is œdematous, hard and enlarged to about the size of a pencil. The clitoris itself is also enlarged and hard.

At present, and following a still uncompleted course of therapy, the condition of the lesion is the following: those previously cystic are no longer so. The color is now a uniform dusky red where it had previously been yellowish. The distribution of the lesions is unchanged, although they all seem to have shrunk.

From the fossa navicularis downward to about an inch beyond the anus and extending about two inches laterally from the median line over the buttocks there is an irregular polypoid, hard, and indurated mass, the margin of which is œdematous and indurated. The polypi, which are bluish-red, of varying size, are located mainly in the median line, whereas the ulcerous portions lie toward the periphery. The ulcers are small, few, and very superficial, in no wise resembling those of tuberculosis or lues. The anus is completely concealed by the polypi and can hardly be seen even after spreading them. In conclusion, it should be stated that the whole rectum as far as the finger can reach is similarly transformed, that is, its walls are irregular and covered by polypi and the periproctal tissue is indurated. Rectal examination causes no bleeding. The internal genitals, uterus, adnexa, and parametrium are absolutely normal.

Proctoscopic examination.[1] The introduction of the proctoscope and the entire examination were rather painful, due to the rigid rectal walls. The instrument could be inserted about 1½ inches. The mucosa was readily seen to be highly inflamed, and in turning the instrument upon its axis, the mucosa was found covered with papillomatous growths of various sizes resembling those about the anus. No bleeding was caused by the examination.

Microscopic examination. 1. End of May: A few small areas containing several cystic lesions were excised from the labium. Fixation ten per cent formalin, imbedded in paraffin, stained with eosin-hematoxylin and Van Giesen. The epidermis is thin, not mitotic. The papillary body nearly obliterated is represented by a wavy line. The connective tissue is hypertrophic and consists of fibroblasts and old connective tissue cells. The lymph vessels are dilated, and here and there, near the surface, a small almost circular cystic lumen filled with lymphocytes may be seen. The border of this structure is made up of a few flat cells, presumably endothelial in nature. The blood-vessels are slightly increased both in number and size. The picture is not that of a definite lymphangioma, but simply suggests lymphangiectasis with hyperplasia of connective tissue.

A few lesions were pricked with a sterile pin, the serous contents spread upon a slide after the manner of a blood smear. Some were stained with Jenner, some with carbol fuchsin for tubercle bacilli, some with Giemsa for spirochætæ. The cells in the fluid were entirely small lymphocytes. No organisms of any kind were found. Three weeks later further studies were made. Four lesions were excised, as follows:

(1) A growth from the right labium.
(2) A growth from the perineum.
(3) A growth from the area beyond the anus.
(4) A polypoid lesion from the left gluteal area.

All were prepared and stained as in the first instance. Only the first of these four was distinctive. The others were alike, so that they may be included in one description. The former was covered with a thin but otherwise typical squamous celled epithelial covering. The papillary body was wavy. The cutis consisted of old connective tissue, containing dilated lymph vessels, not cystic, however, and near the surface a few polynuclear cells were to be seen. The group embracing the other three specimens simply showed features of hypertrophic granulation tissue, covered by epithelium. Nowhere were giant cells or caseation necrosis to be seen. One specimen stained by the method of Levaditi failed to show spirochætæ. Smears from the rectal discharge were in vain examined for gonococci and spirochætæ.

Further laboratory procedures, such as blood counts and Wassermann tests, Von Pirquet reaction, failed to throw any light upon the case; the former showing nothing abnormal, and the Wassermann reaction was negative on two occasions. The Von Pirquet reaction was also negative. An intravenous injection of salvarsan made for diagnostic purposes produced no effect upon the lesions.

All these observations were made during the period of six weeks in which the patient was in the wards of the German Hospital (service of Drs. Seeligmann and Stein).

The deductions to be drawn from this case are comparatively clean-cut. We have before us a chronic disease characterized *first* by a destructive process, *secondary* to which are developed elephantiasis, lymphatic dilata-

[1] For the use of his new proctoscope we are indebted to Dr. Heinrich Stern.

tions even to the point of cyst formation (as in Szasz fourth case; see below), finally papillary hypertrophy or polypoid excrescences. Clinical and pathological evidence rule out direct specific causative agents, notably those of syphilis and tuberculosis. Likewise malignancy may be definitely excluded. Obviously, then, the lesions must be a manifestation of some remoter cause. This we find in the first place in the chemical irritation of the discharge from her rectum, and in the second place in the rectal stricture, both presumably being due to an earlier rectal gonorrhea. On purely mechanical grounds the lymphatic stasis would account for every clinical and pathological feature of the case except the original ulcerations. Such a condition and process, at once destructive and hypertrophic, would correspond to what in later years has come to be understood under the term of esthiomène.

In looking over the literature we find but one other case that absolutely corresponds to the one we have just described. This is mentioned in an article by Szasz, entitled "Ueber Esthiomène," which appeared in the Monatsschrift für Geburtshülfe u. Gynækologie, 1903, p. 994. It is the third case among his seven.

"K. B., 43 years old, single, laundress, entered the hospital on April 14, 1901. Parents, brothers and sisters died of causes unknown to her. Twenty-seven years before, she had given birth to a child; she had never received medical treatment. For the past eight years there was difficulty upon defecation. She had several movements daily, always small in quantity and accompanied by tenesmus. For six years she had been suffering with pruritus ani and for about a corresponding length of time she had noticed upon the external genitalia and about the anus a tumor mass. Also after this time she had noticed a purulent discharge from the rectum (unquestionably a rectal gonorrhœa).

"*Status præsens.* Both of the larger labia were markedly swollen. They literally formed a tumor with an irregular surface, the size of a hen's egg, and resting upon a pedicle. Both of the glutei, particularly, however, the right, are swollen and indurated. Both, more particularly the left, are covered with several fistulous openings covered with granular tissue. The external genitalia in toto are swollen. The lower part of the swelling abuts against the swelling upon the buttocks. The surface of these parts glistens, is infiltrated and in many places lichenified. Upon separating the glutei, there may be seen nodules varying in size from that of a lentil to a pin, each resembling in a large measure hypertrophic hæmorrhoids. The hypertrophic labia are hard and elastic. The contiguous inner surfaces are smooth, light in color and moist. In the left inguinal region there is a gland the size of a lentil; upon the right side is one the size of a pin and several the size of lentils, cartilaginous in consistency and palpable. In making a rectal examination, it is found that the finger can be inserted only 6 cm., where a hard stricture is to be felt; over the right ankle there is a small patch of eczema.

"*Diagnosis.* Elephantiasis of the external genitalia, stricture of the rectum. On May 8, 1902, the patient reappeared at the clinic. Her status præsens differs from the above in the respect that conditions about the genitalia have gone on to further development. The rectal stricture is more marked. The diameter is that of a pencil. The entire stricture is funnel-shaped.

"*Microscopic examination.* The hypertrophied labia show the well-known picture of elephantiasis cutis. The second characteristic lies in the enormously dilated lymph vessels. Sections from the peripheral portions contain small cysts which can be seen with the naked eye. Upon pricking one of these a drop of clear lymph can be recovered. The cysts are lined with a single layer of endothelium. In the pus from the rectal discharge and the fistutlæ only strepto- and staphylo-coccus could be found. Search for tubercle bacilli was in vain."

It seems clearly established that we are dealing with a condition the etiology of which is still vague. But one of the cases is entirely identical with ours, (Szasz' third case), while one (Szasz' fourth case) resembles it only in having a few lymphangiectasis. The rest of the cases described in the literature are due to a specific infection (Koch, Victor Bandler, Robert Taylor and others). In all but the two cases just mentioned, cysts were absent. It may thus be argued that in our patient we are dealing with some type of true lymphangioma, in effect a neoplasm of the mons veneris and external genitalia. It will not be difficult to show that this is not so.

Our conception of lymphangioma is not a perfectly clear one for the simple reason that it is difficult clinically and pathologically to distinguish between a lymph vessel new growth and a lymphangiectasis. Winiwarter, Wagner, and Unna have attempted rather unsuccessfully to clear up this subject, but have succeeded mainly in splitting hairs. One very readily recognized disease coming under this caption deserves closer scrutiny;

this is lymphangioma circumscriptum cystoides cutis.

Clinically it is characterized by the appearance upon the skin of small, clear cysts from 1 mm. to ½ cm. large, in groups of a diameter of from 1 to 4 inches. These cysts contain clear serum and have non-inflammatory bases. Occasionally in the subjacent skin teleangiectases are found. At times the blood-vessels rupture into the cysts, causing their contents to become hæmorrhagic. The disease is one of youth. It is usually found about the neck, shoulders, upper thorax, lips and even the tongue.

Strange to say, the first case in the literature, described by Tilbury and Calcott Fox in 1879, was one in which the lesions were located upon the perineum and thighs. In no case recorded since then has this been observed. The patient was a young man of about twenty. Fox designated the disease as lupus lymphaticus, and we cannot evade the suspicion that this case may serve as a connecting link between the true circumscribed lymphangioma and the disease with which this paper deals. A further point of similarity is furnished by Freudweiler, whose good fortune it was to observe a case from its inception. The earliest manifestations he noticed consisted of small yellow spots, which becoming raised, ultimately were converted into cysts. In our patient all of these stages of development were present, the flat lesions being situated upon the mons veneris, the others further backward upon the labia. In no case in the literature was any reference made to ulceration of polypoid formation.

Histologically the lesions have been described as clefts corresponding to lymphatic spaces in the connective tissue of the papillary body and cutis. Some were pear-shaped with the apex pointing downward and connected by strands of cells with the cutaneous blood-vessels. All contained lymph cells, all were lined with endothelium, sometimes several layers deep. Freudweiler found no evidence of inflammation. Wäelsch, on the other hand, did. All other investigators agree with Freudweiler.

Concerning etiology, opinions are very evenly divided as to whether the disease is caused by proliferation of the lymph vessel endothelium *per se* or whether it is due to lymph vessel dilatation. Without entering into this discussion, it seems unlikely that a new growth in the true sense of the word can depend for its origin upon a process commonly regarded as inflammatory. In comparing our case, then, to cystic lymphiangomata, we note the following points of similarity, viz., the presence of macules, papules and cysts. More striking, however, are the pronounced differences. In lymphangioma cysticum, ulcerations, hypertrophies, elephantiasis are entirely lacking, and there are no ascertainable mechanical grounds for cyst formation such as are present in our case. Obviously, then, we must rule out the presumption that our case is one of lymphangioma cysticum and seek another diagnosis. This we believe to be the one already mentioned, namely, esthiomène.

Therapy. As in practically all the other cases in the literature, the therapy in our case was unsuccessful. We tried, on purely empirical grounds, arsenic internally. Locally the diseased surface was painted with tincture of iodine, and twice a day the patient received rectal irrigations of potassium permanganate. She seemed benefited symptomatically, but there was no sign, objectively, of any improvement. On the assumption that the causative agent might be some still undiscovered organism, she received iodine cataphoresis. The procedure was as follows: The sponge of the negative electrode of a galvanic current was immersed in tincture of iodine and applied to the diseased area for a brief period. The strength of the current was from two to six milliampères. The treatment was repeated daily for about twenty days, and it seems that there was some shrinking of the growths. On the assumption that the Roentgen rays might produce absorption of the hypertrophied tissues we inaugurated this form of treatment. This, however, has been continued for so brief a period that we can draw no deductions from it as to its value. We contemplate further treatment with ultraviolet rays and the various radioactive substances at our disposal, and furthermore hope to employ de Keating-Hart's fulgurisation method.

As to removal of the diseased tissues either by cutting or burning operations, we might succeed in bringing about a removal of everything but the cause, and we fear that the resulting scars and deformity would be a source of greater discomfort if not actual harm to the patient than the malady itself. The question of producing an artificial anus and totally extirpating the diseased rectum has come up, but obviously this would be too drastic to be warranted by a condition which in itself is apparently not dangerous. Furthermore, the patient is unwilling to countenance such an operation.

Though many cases are clinically similar to ours, they present a different etiology. In practically all, lues or tuberculosis played an important rôle. We may, therefore, disregard them as not pertaining to our subject, since we take the ground that in its true sense "Esthiomène" is the expression of a process set afoot by no known specific agent as a direct exciting cause. We may add that in our case the infection, whatever its nature might have been, was primarily rectal and not genital.

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ACAPNIA AND ITS RELATION TO ANÆSTHETIC SHOCK

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THE physiological question of carbon dioxide control of respiratory frequency and its relation to the causation of surgical shock, with suggestions as to the practical application of its principles to anæsthetic technique has occupied the attention of surgeons and anæsthetists since Prof. Henderson of Yale Physiological Laboratories published observations on the same in various physiological and surgical journals of recent date.[1]

The writer of the following observations realizes the enormous advantage that a physiologist has of verifying physiological hypotheses, and the weight that such advantages would give to his opinions as opposed to those of an anæsthetist or surgeon, so that it is with respect and only after much thought that he ventures to record his dissenting beliefs, deducted from some years of anæsthetic experience.

[1] A. J. Phys., xxiv, 1; xxv, 6; xxvi, 3; xxvii, 1; and SURGERY, GYNECOLOGY AND OBSTETRICS, August, 1911.

First, the writer would express his belief that the actual physiological observations made and reported by Prof. Henderson are absolutely correct, but that the majority of his deductions relative to anæsthesia are misleading.

Second, that rebreathing in general narcosis depends only slightly, if at all, upon its raising the carbon dioxide content of the blood for its beneficial effects. That after such rebreathing or administration of carbon dioxide has once caused hypercapnia to replace acapnia, the consequent increase in respiratory function can hardly be of sufficient benefit of itself to justify the continuation of a procedure which utilizes the accumulation of waste material to whip the respiratory mechanism, at the same moment defeating the very purpose of that increased respiratory function, viz: the elimination of said waste material.

Third, that such rebreathing as is adopted in nitrous oxide-oxygen-ether narcosis by Dr. Gatch has as its beneficial factors:

(*a*) The economy of ether, nitrous and oxygen, economy not alone from the cost point of view but economy in dosage, making the smallest amount of anæsthetic do the greatest work through limiting ventilation of the lungs.

(*b*) The utilization of a technique of administration which excludes entirely the diluting nitrogen of air. When air is administered with nitrous oxide and the quantity reduced to so small amount as to allow enough nitrous for a sufficient depth of analgesia, the oxygen content of the respired mixture is so low as to produce asphyxia. In the closed technique, air is not only excluded from the breathing bag but from the lungs as well, so that the gas breathed is simply nitrous oxide and oxygen minus any diluting nitrogen of air.

(*c*) The gases are warmed by rebreathing and moistened through conservation of expired water.

(*d*) An increase of nitrous oxide pressure is obtainable where needed by filling full the breathing bag, which increase in pressure insures a certain added saturation of the blood with the gas.

If rebreathing is harmless, as adopted in the Gatch technique, below a four per cent carbon dioxide content in the bag, as stated by Haldane and Smith et al., and quoted by Gatch, then possibly such a pathological condition can be tolerated to accomplish the above stated objects.

But the belief of the writer is that such rebreathing is tolerated and not adopted because of any beneficent effect it may have relative to acapnia and its relation to shock or anæsthetic toxæmia.

In discussing Prof. Henderson's belief relative to the acapnic theory of fatalities in anæsthesia and causation of surgical shock, one must outline from the beginning the method by which our anæsthetics produce their effect, as far as possible, and look thoroughly into their toxæmic workings.

Whether the exact chemical change which takes place in molecules of the nerve tissue is one which prevents their proper use of oxygen, as suggested by Prof. Max Verworn in his lecture on narcosis before the Harvey Society, or some other equally difficult to comprehend isomeric molecular rearrangement, the belief that a preponderance of effect in the nerve tissues is due to its peculiar structural arrangement whereby even slight chemical change in one part is diffused and rediffused and communicated to all parts is wholly and preferably tenable as opposed to any selective action of the anæsthetic for nerve tissue.

We are all familiar with the fact that when nerve tissue is being subjected to an agent which arrests its function, that agent serves at the moment of its action to excite that nerve.

Hence when any agent capable of so changing the molecular state of nerve matter as to arrest its function is carried into the blood, it first acts on the nerve cells. Each change produced in one of these, be it the decomposition of a molecule or, as is more probable, the isomeric transformation of a molecule, implies a disengagement of molecular motion or nerve force, that is immediately communicated to its neighboring molecule, each molecule being a center of discharged nerve force, in the act of being incapacitated for further transmittal of motion.

Each nerve cell being thus quickly acted upon, and emitting successive discharges as the successive molecular transformations are wrought in it, there results a general nervous chaos, a tempest of inco-ordinate nerve force discharge, and, as is plainly seen, a corresponding disintegration of the action of vital organs which depend upon fine nervous co-ordination for their control.

The traumatic shock of anæsthesia and surgical procedure has as primary causative factors, first, the afferent nerve assault of fear and apprehension of the operation; second, the afferent nerve assault of the anæsthesia, especially during its induction or throughout an imperfect maintenance; third, the afferent nerve assault of the operative procedure itself and the condition for which operation is performed.

All these elements, in greater or less degree, combine toward the end of determining the degree of central nerve disorganization at the time of and after operation.

Granting that all the actually observed physiological facts be true in Prof. Hender-

son's reports, the hyperpnœa, the resultant acapnia, which factor, in the acapnic state, appeals more to reason as the important element in apnœa vera, the over-ventilation of the lungs with reduced carbon dioxide content in the blood or the raised threshold of the respiratory mechanism, which raised threshold simply means a degree of nervous dissociation in this respiratory mechanism incompatible with its proper response to normal stimuli, be that stimulus carbon dioxide or oxygen?

We believe most decidedly that this latter condition is the important one, and not the coincidental, inconsequential over-ventilation of the lungs; we believe that, beyond utilizing rebreathing or the administration of carbon dioxide for a few minutes as an emergency measure, either of these procedures would have little if any true value, and furthermore, it is hard to conceive of any procedure that utilizes waste material as a whip to the respiratory function as being else but a source of harm if continued for any length of time.

We think that Prof. Henderson has adopted a coincident physiological occurrence, a concomitant condition of the shock, as its cause, and in so doing withdraws attention from the real cause.

In the case of irregular anæsthesia the acapnia produced is not the condition to be remedied, but the manner of administering the ether or its erroneous selection as the agent of choice in a particular case, in this way preventing that toxic depression of the nervous mechanism which is responsible for apnœa vera, anoxæmia and asphyxial acidosis.

The adoption of Crile's principle of anoci-association not only as an element of operative technique but a principle of anæsthesia as well, will be logically going behind the coincident occurrence of acapnia and reaching after all the primary cause of that acapnia, viz., the unbalanced central nerve control which causes the hyperpnœa and consequent acapnia.

The practical application of this belief, instead of administering carbon dioxide or instituting rebreathing, except as a matter of coincident necessity for economy of nitrous oxide, etc., as would be the natural result of Prof. Henderson's theory, adopts the more rational conservation of those elements in traumatic and toxic shock referred to above, viz.:

1. Afferent nerve assault of psychological origin.

2. Afferent nerve assault of the anæsthetic itself.

3. Of the operation and the condition which necessitates the operation.

In other words, adoption of the anoci-association principle as suggested by Crile both in the operative technique and in the narcosis.

This anoci-association principle, so far as the operative technique goes, is a surgical matter and belongs to a discussion on that side of the question; as far as the anæsthetic goes, certain principles of selection of the anæsthetic to suit the individual case at hand are to be observed.

In many cases, ether in the strong, athletic, alcoholic, plethoric or tobacco-using subject becomes a toxic agent, even in the presence of preliminary sedative hypodermic medication. Long before that degree of muscular relaxation and unconsciousness desirable for operation is attained, toxic effects of the drug are noted — hyperpnœa, acapnia, anoxæmia, asphyxial acidosis, and, if the administration is persisted in, apnœa vera and death.

In such cases the effect of the large dosage required is to produce afferent nerve dissociation of the central nervous system, with the chaotic exciting tempest, referred to above, which persists, without at any time causing cessation of nerve function, unless so great a dose is administered as to materially raise the threshold of the respiratory mechanism, and thus induce the chain of symptoms recognized as anoxæmia. True beyond question, under these circumstances, is the statement of Prof. Henderson that what has been done a half-hour before is the determining factor in death or shock, and not the minimum dose administered just prior to the actual occurrence of collapse.

In this state of central nervous unbalance brought on by maximum dosage of the anæsthetic agent, given in an attempt to force unconsciousness and physical relaxation, it

is no wonder that an added few drops of anæsthetic seem to produce the collapse, and a state of acapnia is not the ultimate cause, either.

If there is one predominant indication for the selection of chloroform over ether, it is in these cases, bearing in mind the advantages and possibility of continuing an anæsthesia with ether after the narcotic state has been induced by chloroform.

In operative work for prostatic disease in elderly men, where the general lowered resistance renders narcosis a hazardous procedure, among other things, the principle of anoci-association in anæsthesia lowers the mortality immensely — the anæsthetist is between two fires, so to speak — on the one hand, the danger of over-dosage with actual dissociation of the central nervous control of vital circulatory organs; and on the other hand, the ill effects of too superficial narcosis, with its afferent nerve assault.

Many such cases under the writer's hands have shown him that the afferent nerve assault of toxæmia of the anæsthetic is far more active in producing harm than that of the afferent nerve assault of the operation when the subject is slightly anæsthetized. In such cases the anæsthetist must choose the lesser of the two evils, and even in the presence of hyperpnœa or other evidence of central nerve dissociation, he must narcotize short of complete unconsciousness.

Such being the case in subjects where nitrous oxide and oxygen administration is contraindicated by the condition of the arteries, ether or chloroform and oxygen has to be selected.

SOME DIFFERENCES BETWEEN THE SURGERY OF CHILDREN AND ADULTS[1]

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IN last evening's session of this congress it was refreshing to hear the speakers refer to the surgical differences between children and adults. We have long heard of children's peculiarities in so-called medical diseases, but we have heard little about them in surgical diseases.

There are, however, such peculiarities entirely apart from orthopedics. This evening we will consider them in three localities, the neck, the chest, and the abdomen.

In the neck, we select tubercular disease of the lymphatics; in the chest, suppurative pleurisy (empyema); in the abdomen, tubercular peritonitis.

PART I—TUBERCULOSIS OF THE CERVICAL LYMPH NODES

Concerning the neck, the following statements may be made:

(*a*) Children under two years of age do not often have tubercular disease of the neck lymphatics; when they do have it, they usually show less resistance than older children do.

(*b*) Between the ages of two and seventeen years, tubercular lymphatic disease in the neck is fairly regular in its course, probably as regular as many of the diseases which we consider "definite." The variations are hardly seen in larger proportion than in such diseases as typhoid fever and pneumonia. This is the period where the upper nodes usually break down before the lower nodes are extensively involved. A definite clinical picture is thus formed.

(*c*) In adult life the breaking down of the upper nodes is not so likely to occur; the infection spreads downward and involves the lower nodes, thus presenting a clinical picture and a problem different from that in children.

(*a*) As to the rarity of this form of tuberculosis before the age of two years: The author and his associates and assistants, working in St. Mary's Hospital for Children,

[1]Read before the Clinical Congress of Surgeons of North America, Philadelphia, November 14, 1911. See discussion, page 399.

Roosevelt Hospital, and The General Memorial Hospital, have operated upon 465 cases of tubercular disease of the neck lymphatics. In the entire group there were only fifteen below the age of two years. To show that this age distribution conforms with that of other observers, one may refer to Fischer's [1] tabulation of 1484 cases reported by 19 observers. Only 3.97 per cent of these cases were under the age of five years.

These fifteen patients, who were below the age of two years, showed less power of resisting tuberculosis than the other groups. Ten of them had very extensive involvement of the neck nodes, four of them on both sides of the neck, when admitted to the hospital. Six of them had already had incomplete operations. Five of them had open ulcers or sinuses. Four of them had recently had broncho-pneumonia or severe bronchitis, which were believed, but not proved, to be of tubercular origin. Eight of them had complications of various kinds, among which we may mention retro-pharyngeal abscess, tuberculous adenoids, spino-ventosa, lupus of forehead, and phlyctenular ophthalmia. Seven of them showed very poor healing power. One of them at a later time succumbed to what was believed to be general tuberculosis, another to tubercular meningitis.

This group of patients differs very materially from the group of older children. Possibly cases of this kind have led to the opinion, still held by many, that neck tuberculosis is only one manifestation of general tuberculosis; an opinion which cannot be held by those who study the other groups. Possibly the susceptibility of young children to infection by the bovine type of tuberculosis is one element in the peculiarities shown by this group.

Although these little children seemed very ill, and two of them died within six months of their operations, the ultimate results in the entire group were better than could be expected. Twelve of them were examined at periods varying from two months to nine years after their operations and were found to be in excellent condition, the only evidence of tuberculosis being, in one a lupus spot and a phlyctenular ophthalmia, in another a small lupus spot on the leg, and in another a hard, bean-sized lymph node above the clavicle. The fifteenth case could not be traced, which in a New York tenement population is not strange.

(*b*) The clinical manifestations in the period which follows the age of two years, and includes the age of seventeen years, are of great importance. This is the period in which most of the cases come to the surgeon, 80 per cent among my own cases, about 46 per cent among the cases of Fischer.

In this period of life the nodes have a tendency to break down in the upper part of the neck, before they extend downward so far as they do either in adults or in very young children. At the present time most of the cases which we see are brought on account of a lump, which is really not a swollen node, but a cold abscess. One of the sub-parotid nodes breaks down and discharges its detritus, which, following the course of least resistance, forms an abscess which points sometimes in front of the sterno-mastoid muscle, sometimes behind it. The pictures illustrate the appearance of these cases (see Figs. 1–5).

The real lesion is tuberculosis of a moderate sized group of lymph nodes which have received their infection from the pharynx, mouth or other part of the head, which have become enlarged according to a definite sequence and which in part have become caseous, and the caseous material has broken through the node capsule before the lower lymphatics of the neck have shown infection. Here we have a condition which probably presents the most favorable field there is for the surgical treatment of tuberculosis. A thorough operation can usually be done in less than an hour, the patients are usually out of bed on the third day, and a large proportion of them can leave the hospital by the tenth day, although some of the wounds heal more slowly. The resulting scar can hardly be seen if it is properly placed.

There has been one operative mortality in this group of patients, practically one fourth of one per cent. This, we believe, is less than can be obtained by any other method of treatment.

[1] Dr. Friedrich Fischer, Deutscher Chirurgie, Lieferung 24, a., Stuttgart, 1901.

Fig. 1. Abscess pointing in front of upper part of sterno-mastoid.

Fig. 2. Abscess pointing in front of lower part of sterno-mastoid.

Fig. 3. Abscess pointing behind upper part of sterno-mastoid.

Fig. 4. Abscess pointing in front of sterno-mastoid.

Group of patients illustrating the manner in which cold abscesses form from broken-down nodes in the upper part of the neck and point in various localities.

Fig. 5. Group of tuberculous lymph nodes removed from patient No. 4. The tonsillar node, the largest of the group, was so broken down that it could not be photographed. There was no evidence of tuberculosis in the nodes below the middle of the neck. (Position is reversed in reproduction. The upper node lay just below the mastoid process, the larger middle ones were below and in front close to the internal jugular vein. The small lower ones were also close beside the internal jugular vein.)

At least 320 of the patients in this group (85.5 per cent) corresponded fairly well to this description; that is, they had groups of tubercular nodes which were most marked in the upper part of the neck and which were necrotic there in greater or less extent.

The ultimate results in these cases have not yet been worked out, but apparently we are safe in renewing the statements previously made in another paper, that we may fairly expect freedom from recurrence in 75 per cent and permanent recovery in 90 per cent of the patients.

We strongly advocate operation for these children. If the tuberculous nodes remain in the neck they are likely to cause prolonged suppuration and thus debilitate the child; moreover, there is danger of the spread of the infection to other parts of the body. The photographs in group III indicate the appearance of children who have not controlled the inflammation (see Figs. 6–9).

(c) The third group, the adults, present still a different type of lymphatic tuberculosis. The infected lymph nodes, instead of caseating in the upper part of the neck before the lower part is involved, are apt to extend throughout the entire side of the neck, so that the lower nodes become enlarged almost as much as the upper ones.

The appearance of patients who have this type of inflammation is shown in photographs, Figs. 10 and 11, and the appearance of the nodes after removal is shown in Figs. 12, 13, 14 and 15.

Such nodes show little tendency to become caseous, but are infiltrated with tuberculosis throughout their entire extent. The condition is more serious than that shown in the preceding group; there is less likelihood of the spontaneous limitation of the disease. The operative procedure is more difficult. Surgeons who operate on many of these cases usually advocate some form of longitudinal incision in addition to the transverse incisions, and for these cases such procedure is desirable.

Among the 78 patients over 17 years of age, 54 (69 per cent) showed this distribution of the inflammation. The results have not been quite as good as in the last group. It has been more difficult to limit the disease. There has been one operative death in the entire group, apparently from pulmonary embolus. The patient, who was apparently well at night, was found dead in his bed in the morning. Such lamentable occurrences, however, are rarer after neck operations than after those in various other parts of the body.

PART II—SUPPURATIVE PLEURISY (EMPYEMA)

This disease is much more common in children than in adults. Yet in consulting the three books on children's surgery which have recently been published in the English language, one finds little about its peculiarities in childhood. The statements in the general literature of the subject are confusing. Loomis[1] believed empyema to be secondary to tuberculosis in 83 per cent of all cases. Schede estimated this proportion at 50 per

[1] H. C. Loomis N. Y. Medical Record, Sept. 29, 1900, p. 481.

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 9.

Group of patients who show that it is not safe to expect the disease to be self-limited, even when the children are at the most favorable age.

cent. These statements must have been due to studies of adult cases, since in children it is not often secondary to tuberculosis. On the other hand, Kermisson[1] writes of empyema as "especially a malady of the first period of childhood," and quotes Finkelstein, whose group of 251 cases contained 46 per cent below the age of five years. It is evident that deductions made from the study of one of these groups will be misleading to one who is to treat patients who belong to the other group. In Roosevelt Hospital, in which there are 29 children's beds, in a total of 237 beds there were 57 cases (45.6 per cent) of empyema below the age of 20 years, in a total of 125 cases. In St. Mary's Hospital for Children, during the last ten years about 3 per cent of all the surgical cases, exclusive of enlarged tonsils and adenoids, have been empyemas. These statistics are sufficient to indicate that the disease occurs in childhood with decided frequency.

In one respect the literature is particularly misleading. The disease is usually referred to as an independent condition, possibly a sequella of pneumonia, but yet an independent entity which calls for independent treatment. This is true so far as the liberation of pus is concerned, but in the more serious cases, other processes beside pus production must be considered. The difficulties in treatment are usually due to one of three causes;

1. Pneumonia, or other pneumococcus inflammations.
2. Compression of lung.
3. Tuberculosis.

The first condition is more common in children. The second occurs in about equal proportion in children and adults, but is more successfully treated in the former. The third is rare in children, but much more common in adults.

In order to study this problem in detail, we have studied 204 cases as they have occurred in St. Mary's Hospital for Children, adding 131 to the 73 cases previously reported. Most of them were between the ages of 2 and 14 years. We have not seen enough children younger than two years to make many definite statements about them, but Dr. Holt, who has had a very large experience in these cases, states that the condition is a most serious one, as it occurs in hospital patients, that the mortality rate in children under a year old is at least fifty per cent. Dr. Rowland G. Freeman reports from the New York Foundling Asylum that no child, who has had empyema in that institution before the age of six months, has recovered.

Older children are not overwhelmed by the disease in quite the same degree, but it is surprising to note how closely our group resembled a group of pneumonia patients; 94 per cent of them gave definite histories of pneumonia preceding the empyema, which, with all due allowance for error, indicates a very close relationship with that disease. The later clinical histories, the examination of the pus and the autopsy findings indicate a similar relationship.

In this group slightly more than fifty per cent of the empyemas in children healed satisfactorily within one to three months of the opening of the chest and resection of a piece of rib. In some of them, however, the pneumonia seemed to continue while the empyema was healing. In the patients with delayed healing (19%) and in the fatal cases (30%) there were many complications. If we consider pneumonia the main disease and suppurative pleurisy simply a complication, we have an explanation for many of these conditions. The pleural lesion masks the physical signs and one must judge by clinical symptoms whether pneumonia really is present. The mortality rate among these patients is high. Unfortunately it is difficult to obtain autopsies in this class of patients, but we have at St. Mary's Hospital the record of twenty such autopsies, which throw more light on the condition than any clinical records can. Thirteen of the patients had pneumonia; five, pneumococcus peritonitis; one, pneumococcus meningitis; four, pericarditis; three, tuberculosis; five, contracted lung.

Every pleural cavity which had been opened was well drained, with one exception. In this exception about three ounces of pus were encapsulated beside an upper lobe which was the seat of pneumonia, although a pus pocket

[1] E. Kermisson: "A Handbook of the Surgery of Children." Oxford Univ. Press, 1910, p. 687

Fig. 10.

Fig. 11.

Figs. 10 and 11. Adult type of tubercular cervical lymph nodes. The entire group is enlarged from top to bottom of neck and there is little or no tendency to caseation or abscess formation.

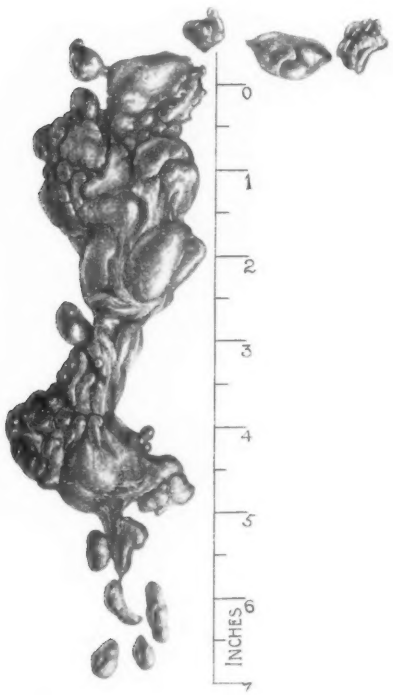

Fig. 12. Tubercular nodes (adult type) removed from neck of patient shown in Fig. 10.

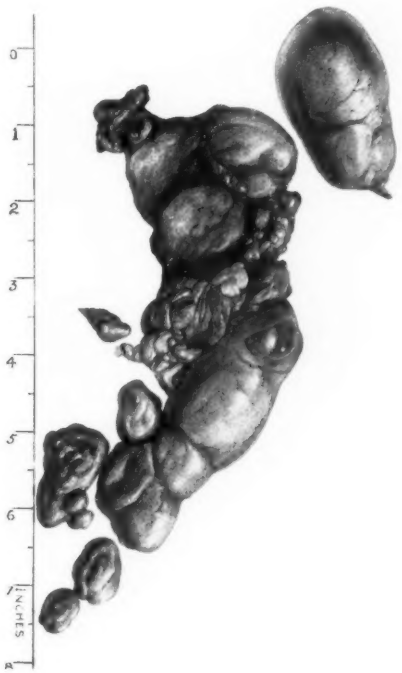

Fig. 13. Tubercular nodes (adult type) removed from neck of patient shown in Fig. 11.

Fig.. 14 Interior of one of the tuberculous lymph nodes shown in Fig. 13. Uniform enlargement of node without caseation.

had been drained from beside the lower lobe where pneumonia also existed. In five other instances very small spots of beginning empyema were found adjacent to lungs, which were the seat of pneumonia. All of these patients, however, were so ill of other conditions that the beginning suppuration was not important. These autopsy findings indicate how great is the error of believing suppurative pleurisy to be the important element. The patients were suffering from pneumonia, peritonitis, pericarditis, meningitis, and tuberculosis. It is manifestly wrong to pursue such patients too vigorously with aspirating needles or to etherize them and search for visionary pockets of pus.

In this group of cases one notices the preponderance of pneumococcus inflammations. The reports of pus examinations, so far as they are available, indicate that pneumococci were found in 52 instances, streptococci were found in 6 instances, no bacteria were found in 9 instances.

The pneumococcus pus is usually white, or greenish white, fairly thick and contains coagulæ. This is regularly the appearance of the pus found in these cases. Holt states that only once has he seen from a child's chest fluid very thin at first and later becoming frank pus. The writer's experience corresponds with this.

In adults, the condition is different. We have notes of forty cases occurring in private practice and in the services of my colleagues and myself in Roosevelt Hospital and in the General Memorial Hospital. In fifteen of the cases, the fluid was thin instead of being "creamy pus," and in eleven of these a foul odor is mentioned. The bacterial examinations give in eight cases pneumococci; seven, no growth; six, streptococci; three, staphylocci; one, various cocci and bacteria. With regard to unexpanded lung and to tuberculosis among the adults, the records are not satisfactory, since so many of the patients are referred to the out-patient department soon after the thoracotomy. But we believe that both of these conditions are more common in adults than in children, and in operations for the former condition better results are obtained in children, as is shown by the accompanying pictures (see Figs. 15–18).

PART III — TUBERCULOUS PERITONITIS

This is one of the most evasive of diseases; it may exist for months or years without making itself manifest. The surgeon, in operating for hernia or appendicitis or other abdominal lesion, may find the peritoneum riddled with miliary tubercles, although the patient's symptoms had not suggested such a lesion; or, when he has to deal with intestinal obstruction of uncertain origin, he may find that tubercular peritonitis had long existed, and that fibrous bands, the product of its healing lesion, are the real cause of the obstruction; or, what is altogether more disturbing, the patients are brought to him in a hopeless condition with abdominal tuberculosis so far advanced as to be incurable, but without having long shown that they were suffering from serious illness. There is abundant evidence that surgical operation is helpful in certain stages of this disease. Spencer Wells' patient, the pioneer who had extensive ascites, "myriads of tubercles," and multiple adhesions, enjoyed good health and was living at least 27 years after her operation. König, Czerny, Fenger, Mayo, and Murphy may be

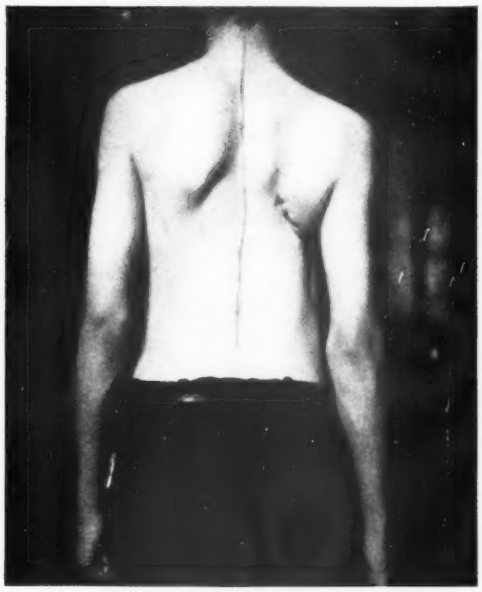

Fig. 15.

Fig. 16.

Figs. 15 and 16. Results of rib resection. In children—good healing, erect spine and good breathing capacity; after extensive thoracoplasty.

Fig. 17.

Fig. 18.

Figs. 17 and 18. Results of rib resection. In adults—delayed healing. Fig. 17, after thoracoplasty. Fig. 18, after rib resection. Photos taken respectively 3½ and 6 months after operation. The writer has seen these two and two other cases of delayed healing in adults in a single year.

mentioned among the later advocates of surgical procedure in this disease.

There are, however, two conditions in which operation seems particularly desirable:

(1) The early form in which there is much ascites.

(2) The form in which there is a lesion so localized that a definite focus of maximum infection can be removed.

In working among children it has seemed to the writer that an undue proportion of the patients have had far advanced lesions; for instance, one child was supposed to have been cured by medical and hygenic treatment, but finally had intestinal obstruction and was really moribund when surgical aid was sought. She died without operation, and at autopsy the intestines were found matted by adhesions almost as though plaster of Paris had been poured among them and had hardened. Several other cases were brought to the hospital with thin bodies and large abdomens which contained multiple nodules and in which tubercular inflammation had advanced so far that operation was futile; even examination of the depths of the abdomen was impracticable, lest fistula should be produced.

In order to compare the conditions of these patients with adults, we have studied a group of 46 children, mostly in St. Mary's Hospital, and also the records of 30 adults who have been treated by the writer's colleagues or by himself in Roosevelt Hospital. I wish to thank Dr. Brewer, Dr. Peck and Dr. Taylor for permission to consult some of their histories.

In only seven of the children was fluid present in marked degree, and in only four instances was there likelihood of relieving the condition by removing any organ; in each of these instances the appendix vermiformis was removed, but the results were disappointing.

Several patients, however, showed marked improvement after operation, even though they had very extensive dissemination of their tubercular inflammation. This was shown particularly in the disappearance of thickening from the omentum. One, whose omentum was more than an inch thick and which showed multiple tubercles in a specimen which was removed, was subjected to a second operation for another purpose more than a year later, and the omentum was found to be almost normal. At least seven other cases have been found in excellent condition at periods varying from one to seven years after their operations, and we believe that a search which is now being made will lead to the discovery of others. In no instance was inflammation so localized about the uterine appendages that their removal seemed desirable, nor was it localized in the intestine so that partial resection was indicated, nor was the inflammation confined to the vermiform appendix. In the adult cases, however, there were twelve patients who had excessive amounts of peritoneal fluid, six from whom portions of intestines were excised, and nine from whom portions of the pelvic organs were removed.

This study indicates that children are more apt than adults to have the form of tubercular peritonitis which spreads insidiously so as to involve a very large part of the peritoneum, and which does not give a large percentage of localized inflammations.

OBSERVATIONS ON THE THYROID GLAND AND ITS DISEASES[1]

By CHARLES H. MAYO, M. D., Rochester, Minnesota

THE experimental and clinical investigations made during the past few years have added greatly to our fund of knowledge concerning the glands of the body. The paucity of facts in earlier times as regards the function of these glands renders their study more fascinating and has attracted many experimental and clinical observers into the field, while between the two the theorist has developed who certainly is not lacking in a production of near facts. The interrelationship of the various glands, both duct and ductless, seems to be of positive importance. This fact has made the study of these glands extremely complex and vitiated much of the experimental evidence.

Of all the glands of the body none are of more interest or apparently of more importance than the thyroid. This gland is derived from three anlage, the greater or superior portion arising from the median body developing between the three parts of the embryonic tongue. In the descent of this portion of the gland we often have anomalies through delay of the thyroid or early development of the hyoid. First, the gland may remain between the three parts of the tongue; second, a part of it may be left above the hyoid, or third, by dragging down a portion of true embryonic pharyngeal mucosa, midline mucous cysts of the neck may develop. In the treatment of these cysts we naturally find it necessary to look for a portion of such tissue behind the body of the hyoid bone, and here a bit of gland tissue will often be found. In the descent of the thyroid, the central portion is often entangled and held by the developing hyoid, causing this portion of the gland to string out into a pyramidial lobe. The upper portion of the gland should unite during the seventh week of life with the lower lateral which are formed in the fourth grooves, but it may happen that the thymus gland, which is formed in the third groove, drags one or both portions lower in its progress to a substernal position, rendering this part of the gland substernal or intrathoracic, accessory or aberrant.

The parenchyma of the thyroid consists of closed vesicles or alveoli lined with a single layer of columnar cells. In the interspaces of the connective tissue are lymph channels, some of which apparently empty into the veins of the gland. This small encapsulated gland, an ounce or an ounce and a half in weight, receives its blood supply from approximately the same source of origin as do the vessels of the brain, frequently with an additional fifth vessel. The area of arterial supply to the thyroid is approximately that from the circle of Willis to the brain, while in hyperthyroidism the arteries of the thyroid are often greatly dilated.

In discussing the thyroid it is impossible not to consider the relationship of this gland to the parathyroid glands. These four small epithelial bodies, formed in the third and fourth grooves of the neck, were discovered by Sandstrom in 1880, and have been described by many observers since, among whom are Gley, Forsyth, Welsh, Vincent, Jolly, MacCallum, Halsted, Haberfeld, Yanase, and a host of others, who have proven that they are of definite importance. Undoubtedly these bodies have much to do with the stability of absorption or excretion of the mineral salts of the body and therefore upon the tissues (nervous system, bones, etc.) dependent upon such salts; consequently with their loss (if death from tetany does not result), there is apparently a decreased resistance against infections. It has been shown by Haberfeld and Yanase that these glands may vary greatly in size, activity and structure from hæmorrhages into them which probably take place at birth. They have shown the glands to be deficient in nearly all cases of death from infantile tetany. The deficiency may be due to loss of parathyroidal tissue or hypoplasia. Knowing their impor-

[1] Read before the Clinical Congress of Surgeons of North America, Philadelphia, November 13, 1911. See page 397.

Fig. 1. (Case 21807.) Colloid goiter.

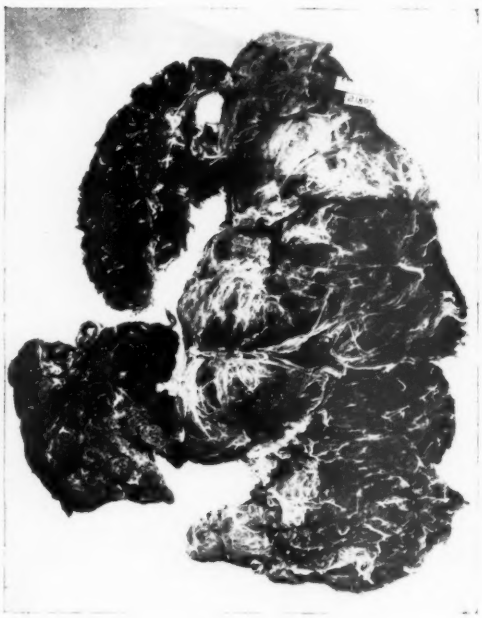

Fig. 2. (Case 21807.) Photograph of colloid goiter.

tance, yet being unable to estimate their physiologic function, it is most essential that these bodies be preserved from injury in operations upon the thyroid gland; especially is this true in operations upon both lobes.

Should the parathyroid be injured and tetany ensue, the condition may be temporarily relieved by giving the lactate of calcium by mouth or subcutaneously, repeating as necessary when indicated by a return of symptoms, and later, feeding of parathyroids. If the tetany be due to loss of gland rather than to interference with its circulation, parathyroids from other persons should be transplanted. While the factor of safety of the thyroid is considered to be normally six times the necessary secretion, it is very probable that the parathyroid is but four. Thus, while one sixth of total thyroid cells will suffice, one normal parathyroid should also be sufficient. In over 3,000 operations upon the thyroid, we have seen but one mild case of tetany.

The secretion of the thyroid gland is a thin,

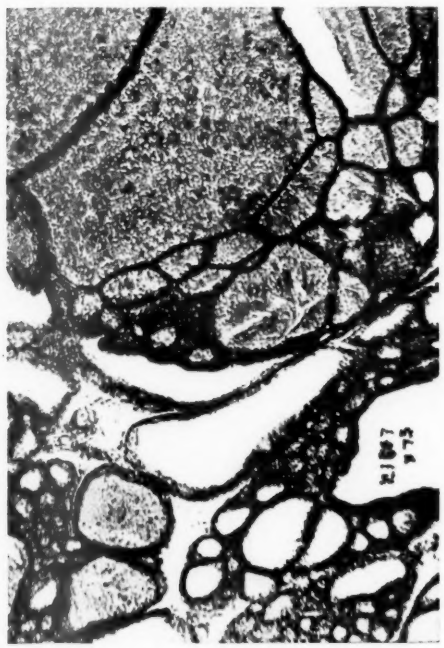

Fig. 3. (Case 21807.) Microscopic section through colloid goiter.

nonstainable substance which contains iodothyrin. The thyroid gland contains a certain amount of iodin. Less iodin is found in colloid goiter than in the normal, when both are compared bulk for bulk. In exophthalmic goiter the iodin is decreased below that of the normal, and Reid Hunt has shown that in hyperthyroidism it is present in excess in the blood, as would naturally be expected.

Concerning colloid, which is said to be the secretion of the gland, there is some doubt, since glands which are over-active have little colloid in the active areas and areas which are evidently inactive are replete with it. In the latter case the vesicles are often so full of colloid that at times the columnar cells become essentially non-secreting, pavement epithelium. The material seems to be capable of absorption but slowly, except the watery edematous colloid conditions seen in the goiter of adolescence which so commonly reverts to normal gland. The reason is, therefore, justifiable why some look upon colloid as a compliment of sponge material which represents in a varying degree, according to its presence, the activity of the vesicle or alveolus which contains it. In simple goiter this condition is marked, and often four-fifths the size of the gland may be caused by colloid deposit in one-fifth of the alveoli. (Figs. 1, 2 and 3.

Iodin in small doses has a tendency to stimulate the gland and cause absorption of retained secretion of the thyroid, especially of the watery colloid in adolescence or in the early stages of simple goiter. However, such iodin stimulation in old, long-standing colloid goiters of middle life may be the cause of a degeneration through over-stimulation and a deficient ability of natural absorption in such areas, resulting in a degeneration of the heart and eliminating organs.

Through the lack of secretion of the thyroid gland in infancy there results failure of growth and development, both mental and physical. (Fig. 4.) Because of the relation among the ovaries, uterus and thyroid (the latter being a true sex gland as well, the duct of the intervertebrate often emptying into the uterus), we find the goiter of adolescence. The goiter of pregnancy is a physiologic

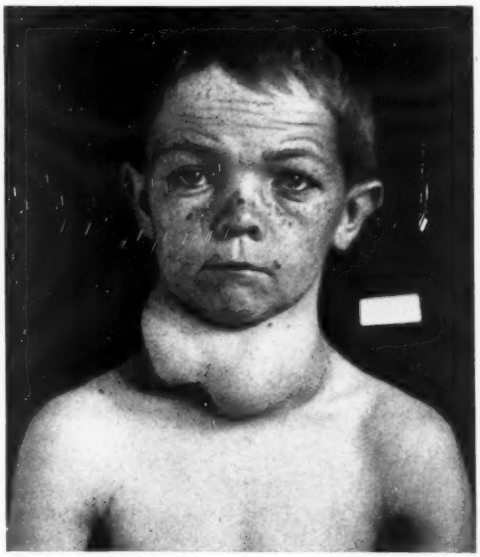

Fig. 4. Cretin with tumor.

increase, and at the climacteric we find, in the failing of this relation, the fluctuations of the activity of the thyroid from hyperthyroidism to hypo-thyroidism, finally ending in the increased weight of the individual usually noted.

The encapsulated adenomas apparently originate at times as a rest tumor of encapsulated gland or a fœtal adenoma. (Figs. 5, 6 and 7.) Rarely they may continue as fœtal thyroid. More often they have developed from the enclosure by an inflammatory capsule surrounding special colloid or retention areas in simple or colloid goiter. All are liable to degeneration; cystic, fibrous, calcareous, malignant, or all varieties may be found in the same gland. There is a form of acute degeneration with a granular breaking up of the cell which seems essentially toxic, and this may occur from unknown causes. It is apparently increased and at times produced by treatment, such as serums intended to induce cytolysis.

The operative treatment is essentially safe and curative in all cases except where degeneration is malignant or has developed heart and kidney complications. Operative interference is but rarely indicated in the goiters of

Fig. 5. (Case 23267.) Encapsulated adenoma.

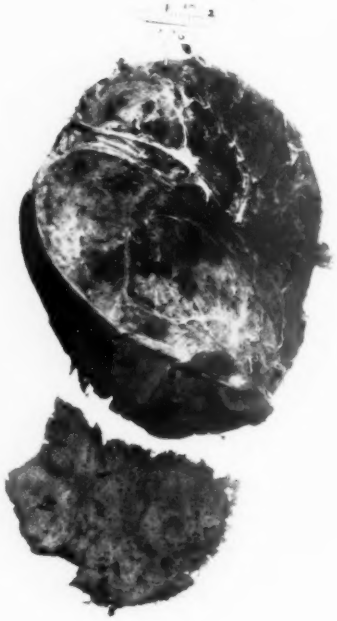

Fig. 6. (Case 23267.) Photograph of encapsulated adenoma.

adolescence unless they enlarge and resist treatment or become encapsulated adenomas.

It has been the constant effort of the medical profession to cure or control disease by a study of its causes. Hyperthyroidism is woefully lacking in evidence of its etiology, excepting the condition of the gland. There are many theories, but none as yet worthy of general acceptance. Since it lacks the essential features of other serious diseases, it is the study of the profession to find and anticipate the cause in order to prevent this disease.

In 1886, when Mœbius advanced the theory of thyroidal secretions as the cause of the symptoms which, up to that time, had been variously attributed, we had the first real advance in the subject. This theory of Mœbius has not yet been generally accepted, especially by those of the profession who are contemporaneous with the older period of medicine.

In hyperthyroidism, we have a transient or continuous oversecretion. (Figs. 8 and 9.) When this occurs beyond the normal ability of the body to neutralize or destroy, it becomes toxic to a greater or less degree. The evidence in the gland does not consist in the findings of retained secretion, a condition which would be simple goiter, but in an enormous increase in cells, in parenchyma, that is, with every evidence of activity in the gland, such as is present in a lactating breast.

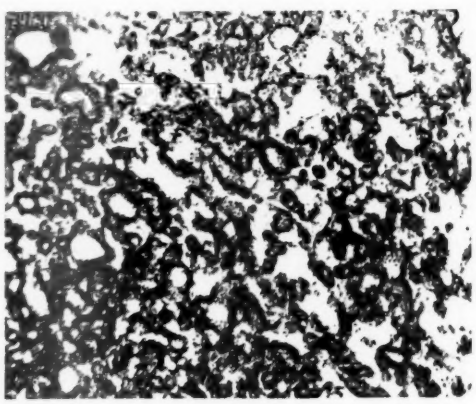

Fig. 7. (Case 23267.) Microscopic section through encapsulated adenoma.

Fig. 8. Exophthalmic goiter. Age 4 years.

Undoubtedly many cases of hyperthyroidism are transient. These and even well marked cases may make a good recovery without medicine, with medicine, or in spite of various forms of treatment. It is undoubtedly some of these latter cures that have placed the high value upon certain drugs in the treatment of the disease. It is very probable that certain methods of treatment tend to neutralize the effects of the excessive secretion, favor elimination, check the activity of the gland, as, for example, by climatic influence, rest, drugs, gland therapy, external stimulus, X-ray, reducing blood supply, ligation, injecting boiling water, and by the removal of more or less gland tissue. Until something more effective is found for its relief, hyperthyroidism should be considered a surgical disease unless proven otherwise by a rapid improvement under medical treatment. We are not always able to estimate the exact amount of gland which should be removed in order to restore favorable conditions, and after the primary relief following operation, compensatory hypertrophy may develop in the remaining lobe; a persistence of the cause or too little of the gland removed may lead to a partial return of symptoms. However, this should not occur in more than six to eight per cent of the cases. In such cases we should advise reducing circulation or removing more gland.

Aside from the slight mortality following operation, all patients are benefited and the majority are cured. We must remember that

Fig. 9. Exophthalmic goiter. Age 58.

these operations, when applied as last resort methods, are not calculated to cure brown atrophy of the heart, muscle or fatty degeneration of the liver, chronic nephritis, etc. Early operation should, however, prevent such conditions from developing.

The majority of patients can safely take a general anæsthetic. Local or combined local and general anæsthesia are indicated in certain cases of heart, kidney and lung, or tracheal complications.

What is the mortality of the disease? By some observers of from 55 to 100 cases, it is given as 25 per cent within five years. It seems probable that in this total estimate of cases are not included some of the early and mild ones. We believe that the natural or medical death-rate might be between 10 and 15 per cent. The mortality from operating on this gland has been greatly reduced from that of the early years of its surgery, being now from 2 to 4 per cent. In a present series of cases in St. Mary's Hospital, over 160 patients having marked hyperthyroidism have been operated upon without a death. There are certain conditions which contribute to mortality; they are excessive dilatation of the heart, nephritis, diabetes, cerebral in-

co-ordination, insanity, and operating at the height of the attack with marked gastric and intestinal symptoms.

The operation for hyperthyroidism is not an emergency one nor is it to be called life saving in the extreme condition. As the surgeon secures judgment as to the stages and condition of the disease and its complications, he is able to select the form of operation or treatment for certain conditions, and he may then with impunity develop his fads in the line of preparation, anæsthesia, operation and after-care, all minor details to which undue importance is attributed.

In general, operations for goiter are becoming very common, not because of an increase in the disease, but because the laity are beginning to appreciate the benefits and the safety of operation, and surgeons are operating on goiters of long standing. Since the first of the present year, a little over ten months, nine hundred operations for goiter have been performed in St. Mary's Hospital with a mortality of one per cent.

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APOPLEXIA UTERI

A Well-Marked Case in a Woman of Fifty-four Years.

By JOSEPH McFARLAND, M. D., Philadelphia

A WHITE widow, S. Y., aged 54 years, a consumptive, was admitted to the Henry Phipps Institute for the Study and Prevention of Tuberculosis, November 27, 1907, as Case No. 5,699.

Her family and personal history, recorded at length, contains no facts that seem to have any definite influence in explaining the interesting condition to be considered below, and may therefore be synoptized briefly as follows: As a child she had measles, whooping-cough, scarlatina, mumps, chicken-pox and was vaccinated. Later she had influenza and pleurisy. She married at an early age, was a wife for thirty-one years before her husband died, and was the mother of twelve children.

When admitted to the hospital of the Institute, she was suffering from chronic pulmonary tuberculosis, said to be of a year's duration, and was much emaciated. She had never had hemoptysis.

She underwent the usual searching physical and clinical examinations, the details of which are on record at the Institute, but which can well be omitted here. She had passed the menopause some years before, and at no time during her stay in the hospital — a year and three months — much of which time was spent in bed, did she have any leucorrhœal or hæmorrhagic discharge from the vagina.

She had occasional attacks of painful micturition, and once had retention of urine that had to be relieved by catheterization.

At one time she had had a "milk-leg," after which she was weak on one hip for ten months.

Toward the end of her illness she suffered a good deal from diarrhœa.

She died in the Institute February 29, 1908.

Autopsy. As the conditions found have little bearing upon the endometrial condition to be described, they will be given in abbreviated form.

Brain and Cord — Apparently normal.

Larynx — Normal.

Pericardium — Partly adherent; adhesions old.

Heart — Slightly rotated to the right; somewhat dilated; no valvular defects.

Right Pleura — Generally adherent and thickened; well-enclosed empyema between the lung and the diaphragm.

Left Pleura — Free of adhesions; no fluid.

Right Lung — Tuberculous; scattered tubercles in the upper lobe; no cavities; middle lobe nearly normal; lower lobe compressed by the empyema; carnefied; sinks in water; the tuberculous lesions apparently inactive.

Left Lung — Several cavities, 3 cm., 4 cm., and 5 cm., in diameter; all well circumscribed by dense

Section of the uterine wall of the author's case showing the complete destruction of the endometrium on the left and the wide-spread sclerosis and degeneration of the blood-vessels with atrophy of the muscular substance of the uterine wall on the right.

fibrillar tissue; all in the upper lobe; lower lobe inflated.

Bronchial Lymph-Nodes not much enlarged; anthracotic. Aorta — Scattered atheroma with occasional calcified areas. Spleen — Normal. Adrenals — Normal. Kidneys — Chronic diffuse nephritis. Stomach — Normal. Small Intestine — Normal. Large Intestine — Normal. Liver — Slightly "nutmeg" from combined fatty infiltration and congestion; slightly enlarged. Gall-Bladder — Normal. Bile-ducts — Normal. Vermiform Appendix — Normal. Rectum — Hæmorrhoids. Ovaries — Very small and atrophic. Uterus — Apoplexia uteri; atrophy. Tubes — Normal. Bladder — Normal.

Dr. W. E. Cadbury, the pathologist of the Institute, concluded that death was caused by septic infection from the empyema, the renal disturbance, and the pulmonary tuberculosis.

The subsequent microscopic examination of the organs gave the following additional information:

Right Lung — Healed tubercles, peribronchial pneumonia, anthracosis, compression, fibrosis, purulent bronchitis, congestion and œdema.

Left Lung — Scattered tubercles; emphysema.

Heart — Slight passive congestion and some fibrous myocarditis.

Spleen — Slight passive congestion; scattered miliary tubercles; hyaline (amyloid?) changes in the smaller arteries; groups of miliary tubercles.

Liver — Passive congestion; cloudy swelling; no fatty change; no tubercles found.

Ovaries — Atrophic, cirrhotic; hyaline corpora and blood-vessels.

Uterus — Hæmorrhage of the endometrium; apoplexia uteri.

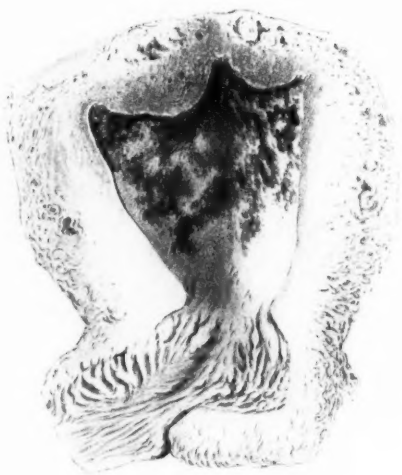
The chief pathological lesions, and those naturally of greatest interest to the clinician, centered about the lungs and the pleura, but the condition found in the uterus and thus far simply mentioned as *apoplexia uteri* is the one which seems to merit special comment.

The uterus was not accurately measured, but it was of small size, its walls somewhat thinned, its substance flaccid, and when

Photomicrograph showing the effect of the elastica stain (Weigert). On the right the vessels are but little disturbed, on the left they are transformed to hyaline cylinders.

sectioned vertically distinguished by abnormal visibility of the blood-vessels, which projected from the cut surfaces of the uterine muscle.

Longitudinal section of the uterus of the author's case showing the extent of the hæmorrhagic infiltration of the tissue.



So-called apoplexia uteri from an old woman. (Aschoff.)

and by a universal blood saturation of the endometrium.

The consideration of these salient points embrace:

1. *The changes in the uterine muscle.* These seem to consist in an exaggeration of the senile atrophy commonly seen in the uterine walls of old women. The individual muscle cells impress the observer as being small in size, while the muscular tissue forms thin bands and strands, breaking up into quite inconspicuous bundles that pass to and fro among the greatly altered blood-vessels.

2. *The changes in the blood-vessel walls.* Here again the appearances presented seem to consist of an exaggerated senile transformation. The atrophy and disappearance of the muscular structure cause the vessels to appear greatly increased in number. The changes in thin walls make them appear to be greatly increased in size. Scarcely a vessel can be found whose wall approximates the normal appearance.

The vessel walls appear enormously thickened and the lumena greatly diminished, but this is not through such changes as characterize the usual forms of arterio-sclerosis. The endothelial lining is usually preserved and

well-shown, and beneath it there may be a small increase in the sub-endothelial layer of the intimna, but the chief changes occur in the media, which is enormously thickened and transformed more or less completely into a structureless cylinder. All gradations between muscular vascular coats, in which the cells are slightly separated so as to give a loose reticulated appearance, and muscular coats in which every cell has disappeared, are easily found.

The general appearance of the hyaline material was like that of the corpora in the ovaries and of the hyaline blood-vessels of the ovaries. It was not unlike amyloid, but none of the tissues — spleen, liver and kidney — in which amyloid is common, showed the change when tested at the autopsy, and the only other organ in which amyloid may have been present in microscopic quantity, the spleen, did not present it in indubitable form. It was unfortunate that the tissue of the uterus could not be subjected separately to satisfactory tests for amyloid, but the desirability was not discovered until the tissues had been too long preserved to permit of satisfactory tests. Such tests for amyloid as were tried failed, and the reactions corresponded perfectly with those in the hyaline corpora in the ovaries.

Together with the hyaline changes of the larger uterine vessels there were frequent calcareous deposits either in invisible form intensifying the hematoxylin absorption or in the form of fine granules.

As the endometrial tissue was reached, the vessels, of course, became smaller, and there seemed to be signs of incompetence of their walls. Here and there their walls were more or less infiltrated with red blood-corpuscles.

It was not possible, however, to be sure whether this hæmorrhagic infiltration of the vessel-wall took place through penetration of the erythrocytes into the tissues from the inside or from the outside. The infiltration of the vessel-walls always occurred where the surrounding tissues were well saturated with blood. Careful examination of every vessel in a number of sections failed to discover any lacerations through which the infiltrating blood could have escaped into the tissues.

The results of orcein staining were interesting. In the few normal vessels, and in those showing a mild endarteritis the elastica stained normally and maintained its normal distribution. But in the abnormal vessels, with the early change that has been described as resembling œdema and in which the muscle-cells began to show looseness in attachment, the substance for which the orcein stain has affinity began to saturate the cells, causing the vessel-walls to take on an intense staining until in the large homogeneous vessels the entire vessel-wall became a shapeless mass of such affinity for the stain as to color uniformly black. Verhoeff's and Weigert's elastica stains gave the same results.

The changes in the uterine vessels in apoplexia uteri seem to correspond with those described by Anspach in his paper upon "A Study of the Elastic Tissues in the Parous and the Non-Parous Uterus" (Proceedings of the Pathological Society of Philadelphia, ix, p. 33, November 2, 1906). He, however, attributes the changes in the elastica to the effects of pregnancy, and not to those of senility. They also resemble the changes found by Allen and Corson (University of Pennsylvania Medical Bulletin, March, 1906) in uterine myomata, where, of course, it could bear no relation to pregnancy, but to nutritional changes in the tumors themselves.

3. *The changes in the endometrium.* In the strictest sense, it is impossible to describe the changes in the endometrium, because there was no longer any endometrium. Not a vestige of an endometrial gland nor a single columnar epithelial cell could be discovered in any of the sections. Here and there, traces of the endometrial matrix presented themselves, but usually in a scarcely recognizable form.

The hæmorrhagic infiltration presents every indication of having but recently occurred, as the red corpuscles throughout are perfectly preserved. There was no coagulum in the uterine cavity, and there was no vaginal discharge.

At first blush, the thought presented itself that the bloody exudation was the result of an exaggeration of that occurring during menstruation, but this soon had to be aban-

doned, as the patient was six or seven years beyond the climacteric and the condition different from that seen in the catamenial hæmorrhage.

Not having previously encountered any such exaggerated condition of this nature before, the writer imagined that it was new, and was about to describe it under what seemed an appropriate name, "Hæmorrhagic Endometrosis," when he happened upon a reference to the condition described by Cruveilhier, with which it appeared to be identical.

The literature upon the subject is small, and the condition seems to have failed to find its way into many of the textbooks, Aschoff's "Pathologische Anatomie" seeming to be the only textbook of pathology in which it is pictured.

Cruveilhier (Anatomie Pathologique du Corps Humain, tome ii, livraison xxiv, planche II, fig. 3, 1842) gives a picture and a short description of the condition, calling it "Apoplexie ou hæmorrhagie spontanée avec dechirure du tissue de l'uterus." He found it frequent among the old women of the Salpêtriere. He says that the tissue of the uterus was softened, lacerable and infiltrated with blood. The change was always limited to the body of the uterus, and occurred in two forms — a mild grade, in which only the mucous membrane was affected, and a severe grade, in which the uterine wall itself was involved. There was no bleeding from the genitalia before death, so that he believed the hæmorrhage to be more confined to the uterine wall than to the endometrium.

Rokitansky (Lehrbuch der pathologischen Anatomie, Bd. iii, p. 469, 1861) described the same condition as occasionally occurring in old women, and says: "The uterine substance becomes rotten and the fragility of the vessels is thus explained." He found the change almost exclusively at the fundus of the uterus upon the posterior wall, which appeared red-black and unrecognizable from the extravasated blood which forms a layer of varying thickness embracing the mucosa. The escaping blood sometimes causes the presence of blood in the uterine cavity. It is to Rokitansky that we owe the abbreviation of Cruveilhier's name — Apoplexia uteri.

Kolb (Pathologische Anatomie der weiblichen Sexualorgane, p. 203, Wien, 1864) also observed hemorrhagic extravasations into the uterine tissues of old women. "The entire uterus was in a state of senile atrophy, was flaccid, rotten and crumbly, and from the transverse section the rigid arteries stood out as rigid, white, non-contractile stumps." The endometrium, especially of the posterior wall, appeared, to a limited depth, red-black, softened, lacerable, and transformed into a bloody mass. He also saw some cases in which bloody collections and thick mucus were found in the uterine cavity.

Dittrich (Zeitschrift für Heilkunde, x, p. 92, 1890) saw a similar condition in two old women, aged 66 and 68 years, respectively, dying of pulmonary emphysema and croupous pneumonia, and upon microscopic examination saw degeneration of the media of the blood-vessels. The veins were dilated, filled with blood, and hæmorrhages had occurred into the cavity of the uterus. He supposed that the rupture of the vessels took place because of the abnormal condition of the uterine tissue and of the arterial walls.

Orth (Lehrbuch der Speciellen Pathologischen Anatomie, ii, p. 427) observed apoplexia uteri exclusively in old women, and always in association with senile atrophy of the uterus. His description tallies with that given by Cruveilhier. He found the cervix and portio vaginalis invariably free and the body alone affected. The hæmorrhage extended into the muscular tissue of the uterus.

Von Kahlden (Beiträge zur pathologische Anatomie und zur allgemeinen Pathologie, xxiii, p. 161, 1898), in the most voluminous and most thorough writing upon the subject that has come under the observation of the writer, points out that up to the time of his writing the gynecologists seem to have neglected the subject, and then with great care proceeds to describe and analyze eight cases that occurred in his own experience. The ages of these patients were 75 years, 75 years, 83 years, 87 years, 75 years, 76 years, 66 years and 52 years, respectively. In all these cases there were marked disturbances of the blood-vessels of the uterus; in none was blood found in the cavity of the uterus. The tissue of the cervix was never infiltrated with blood. He believes that the absence of any discharge, the age of the patients, and the absence of any other explanation suffice to connect the condition with the arteriosclerotic conditions found in the uterine muscular tissue.

From these references to the subject, it appears that the condition is correctly described as apoplexia uteri, and that it corresponds fairly well with the cases of Von Kahlden. It is, however, of exceptional interest because of its wide-spread character and the complete destruction of the endometrium. The longitudinal section of the uterus (see cut) show show universally the inner surface of the uterine body was infiltrated with blood which failed to extend to the cervix and portio vaginalis.

The illustration from Aschoff shows the more common and more localized form of the affection.

The age of the patient is two years greater than that of Von Kahlden's youngest case,

and it is interesting to note that such an extreme degree of uterine atrophy and destruction can occur so young.

It is also interesting, though perhaps unimportant, to note that this patient, like those first described by Cruveilhier, died of pulmonary disease.

It is unfortunate that no bacteriological studies of the cases seem to have been made. In the case reported in this paper, Dr. E. Burville-Holmes, the bacteriologist to the Phipps Institute, made a routine examination, in which he found an organism identified with bacillus hæmorrhagium (Kolb) in the pulmonary cavity, and no organisms in the other organs. No culture was made of the endometrial tissue.

It may be well to point out that bloody discharges are not supposed to occur in apoplexia uteri, which is thus differentiated from climacteric hæmorrhages and from what is sometimes described as senile endometritis. Reinicke (Archiv. f. Gynäk., liii, p. 340, 1897), in a paper upon "The Sclerosis of the Uterine Arteries and the Climacteric Hæmorrhages," reports four cases, aged 40, 45, 43 and 45 years, respectively, that he tries to identify with apoplexia uteri, but Von Kahlden rules them out because the typical vascular disturbances were not present. The same exclusion would apply to Ludewig's case ("Über Endometritis Seniles." Inaugural dissertation, Berlin, 1897), and to Duping's cases (Thése de Bordeaux, 1896–97), which are more simple, hæmorrhagic conditions immediately following the menopause. In all cases apoplexia uteri develops only after the menopause has been established for some years.

It is impossible to determine the time at which the hæmorrhagic condition appears. It may be that it is agonal, or it may be that it occurs some time before death. There seems to be no way to find out, as, there being no discharge from the uterus, there is no reason to investigate its condition until the lesion is found at autopsy. The destruction of the endometrium suggests a considerable duration of the condition, but the perfectly fresh state of the blood bespeaks a hæmorrhage of recent occurrence. It is, of course, not impossible that the hæmorrhagic extravasations recur from time to time, the one occurring just before death being the only one recognized.

CONGENITAL STENOSIS OF THE PYLORUS[1]

The Surgical Treatment

BY CHARLES L. SCUDDER, M. D., Boston
Surgeon to the Massachusetts General Hospital; Lecturer in Surgery in the Harvard Medical School

At a meeting of pediatrists and surgeons no subject of greater importance could have been chosen for consideration than that of congenital stenosis of the pylorus.

Since the report of Hirschsprung, in 1888, the development of our knowledge of this disease has been progressive, until to-day there is little doubt concerning it. The etiology alone is obscure. A recognition of the disease by the physician has perhaps been no more tardy than the slow dissemination of information about it would lead one to expect. It is a significant fact, however, that in those communities where the disease has already been recognized an ever-increasing number of cases is being discovered.

One more cause of infantile death is recognized and may be successfully treated.

This subject is alive with interesting problems bearing upon the embryology, the physiology and the chemistry of the gastro-intestinal tract. I propose, in the limited time at my disposal, to present:

1. The facts concerning congenital stenosis of the pylorus.

[1] Read at The Clinical Congress of Surgeons of North America, Philadelphia, November 14, 1911. See discussion, page 403.

2. To state the reasons for believing that surgery offers the best treatment for this disease.

3. To demonstrate, by lantern slides, the salient facts in the pathology and the clinical story of this most important condition.

The pathology. A pyloric tumor is always present. It is about the size of the terminal phalanx of a finger or thumb, oval in shape, smooth of surface, firm or hard, like cartilage. There are never adhesions about it. The lumen of the pylorus is narrowed. The longitudinal folds of mucus membrane are enormously hypertrophied, adding to the narrowness of the lumen. This tumor is caused by an overgrowth and hypertrophy of the circular muscle fibres of the pylorus. The tumor is a muscle tumor; it represents an overgrowth of muscle tissue.

The tumor is as evident at autopsy as upon the living. It exists in the living, whether gastric peristalsis is present or not. It is no more evident to direct touch when gastric peristalsis is present than when there is no gastric peristalsis. It is a passive tumor. Muscle contraction is not necessary to its existence.

That the pyloric tumor encroaches upon the lumen of the pyloric canal is proven not only by the clinical signs in these cases but by the direct examination of the stomach at autopsy and at the operating table. The tumor itself is sufficient cause for the obstruction to the pyloric canal. The obstruction is an anatomic one, and is not necessarily dependent upon physiologic causes. The significance of this fact will appear a little later.

All other pathologic changes are secondary to the obstruction caused by this tumor, viz., the thickened or stretched gastric wall, the dilated esophagus, the empty intestine, the emaciated and wizened body of the baby.

There is little danger that this pathologic picture will be mistaken for the condition found in so-called systole of the pylorus. (Pfaundler.)

Symptomatology. The clinical story cannot be pictured too frequently. The patient is at first an apparently healthy, breast-fed boy. There is present the characteristic persistent obstructive vomiting; the palpable tumor; the visible gastric peristalsis; the constipated, meconium-like stool; the epigastric fulness; the lower abdominal depression; the continuous loss of weight. Despite experiments with feeding and the use of drugs of various sorts, the baby gradually wastes away and dies of starvation. Dies of a pyloric obstruction.

This is the typical picture of an *unrelieved* pyloric stenosis in infancy, and it is the usual termination. The death certificate in cases of this kind in the past, and also to-day, is signed by the attending physician: Inanition, acute gastritis, infantile atrophy, gastro-intestinal catarrh, marasmus, dyspepsia or pyloric spasm.

The prognosis. The mortality of the disease is high. Most cases of congenital pyloric stenosis die of starvation. There is little doubt but that the cases described by Maier and Lauderer are found in young adult life who have suffered during infancy and childhood from pyloric tumor. If such individuals reach maturity, it is only after years of chronic gastro-intestinal invalidism, poorly nourished and perhaps under-developed.

The diagnosis. Owing to the observations of such clinicians as Heubner, Koplik, Pfaundler, Morse, Freund, Baginsky, Schotten, and others, there is little doubt that there is a group of cases with obstruction at the pylorus due to pyloric spasm without tumor.

These pure spasm cases occur in bottle-fed, excitable, irritable, neurotic babies. The onset of symptoms is several weeks after birth. The stools contain fæcal material. The pyloric tumor, if felt, is felt only when the gastric contraction occurs. The vomiting lacks the characteristics of the tumor cases. Cases of obstruction from pyloric spasm sometimes die from starvation.

The serious and desperate spasm cases are the ones that may become confused with the true tumor cases. These desperate spasm cases may occasionally require surgical treatment.

Treatment. That the pure pyloric spasm obstruction can be cured by medical treatment in a large proportion of cases is true. It is also true, so far as I am able to learn, that there is no case of true tumor which has yet been cured by medical treatment. So far as I am

able to determine, no so-called medically "cured" case has ever been proven to have had the disease, but on the other hand many cases of supposed "cure" have relapsed and have been subsequently treated surgically. The tumor has been demonstrated to exist and a cure by surgical means has followed.

Those who advocate and practice the medical treatment of true tumor cases do so upon the erroneous hypothesis that muscle spasm is the chief cause of the obstruction. They lose sight of the fact that it is the tumor that obstructs. At best, medical treatment relieves only the hypothetical spasm that perhaps accompanies certain tumor cases. Medical treatment does not effectively remove the primary cause of the obstruction.

The improvement in Heubner's series of cases and in the cases of others who have thought that they have been treating tumor cases with success is to be accounted for upon the basis of a mistaken diagnosis, or a temporary and not a permanent cure.

It was about twenty-three years ago that the pyloric tumor cases were first well described. During all these twenty-three years the physician has painstakingly striven to treat such cases by medicines and by carefully prescribed feeding. The estimated mortality from an expectant medical treatment is between eighty and ninety per cent. (Monnier.) It is upon this carefully studied medically-treated postmortem material that much of our present pathologic knowledge of this disease is based. The medical treatment of the tumor cases has signally failed to effect a cure.

To illustrate the attitude of medical men in general, and of certain leading pediatrists in particular, toward the surgical treatment of this disease, let me quote from recently recorded utterances and experiences. One says, speaking of a case which came to operation:

"It is, of course, impossible to say, in view of the low condition of the child after operation, whether continued attempts at feeding might not have succeeded in this case. If we had waited much longer, we would have lost the child, and this, to our conscience, seemed sufficient justification for the operation. The fact that the child improved after the operation is, of course, no proof that the operation was absolutely indicated, still it was the only thing that we could possibly think of if we intended to save the life of the child."

Again, speaking of another case, he says: "The child certainly did badly before operation and there seemed to be no other course open, to our judgment."

Another case is cited that showed no sign of dying, except its extreme weakness. It died, and it is used to illustrate the latest period at which interference of a surgical nature is permissible!

Again, one writes: "Most cases of true tumor stenosis will escape the surgeon."

There is recorded a case in which the medical man watched the baby till he was six months old. All stenotic acute symptoms subsided. But the infant developed the most aggravated symptoms of malnutrition. The child was then two years old, a rachitic dwarf weighing 21¾ pounds.

Another case with infantile symptoms of stenosis not operated upon, medically treated, and who is now grown to childhood, is vomiting all solid food.

Still another case is recorded that was medically treated and at six years old lives on vegetable purées, milk and meat juice.

I call attention to these experiences, which might be multiplied, in order to point to those who look upon the surgical treatment of this disease with distrust and as a last resort to be avoided if possible. This attitude is assumed despite disaster under medical treatment. These physicians choose to continue with medical treatment possibly because they are blind to the results achieved in other ways. They are ignorant of the real conditions at the seat of the obstruction. They employ months of experimental feeding with final results, at the very best, wholly unsatisfactory. They think of the surgical operation as an operation for drainage of the stomach. Therefore, they reason, it must be harmful to the delicate baby. They state that the digestion is permanently impaired by the surgical operation. They think the pyloric obstruction is temporary and the baby by judicious medical treatment will be tided along, may be bridged

over its crises until the obstruction in some mysterious and wholly unknown way disappears. These physicians state that the surgical operation upon these babies is attended with too great risk; they say that the mortality is very high; they think that there is less risk to the baby if he is treated medically.

I will take up seriatim the views held by those objecting to operation. *In these considerations will be found the facts or principles upon which it seems to me is based the surgical treatment of congenital pyloric stenosis.*

1. It must be remembered that medical treatment has demonstrated, through nearly a quarter of a century of experimenting, its inability to cure this disease.

2. The cause of the obstruction at the pylorus is the encroachment of the tumor upon the lumen of the pyloric canal. To demand medical treatment for these cases of obstruction is as logical as it would be to treat pyloric stenosis in the adult medically. The mechanically obstructed urinary bladder, gall-bladder, intestine, ureter, bronchus, esophagus, and the obstructed stomach, each and all, fail to be permanently relieved by medical treatment. Either the obstruction must be removed or a way made around the obstruction. This can only be accomplished by surgery.

3. The immediate response to surgical treatment in successful cases is very noticeable, as shown by the early postoperative gain in weight, the proper infantile stool, the peaceful contentment of the baby, the complete cessation of vomiting. These facts are in marked contrast to the erratic gains and losses under medical treatment, and serve to endorse surgical methods.

4. The operation done on these babies is not a gravity drainage operation. Hence it is not harmful. The operations done on these babies have been either a Loreta operation, a pyloroplasty such as Nicol of Glasgow employs, or a posterior gastrojejunostomy. I believe that the consensus of surgical opinion favors the latter operation, a posterior gastrojejunostomy. It seems to me to be the best operation. Most of the operated cases have had this operation done. This is now known not to be a so-called drainage operation. But the stomach contents are forced by intragastric pressure through the stoma as through the relaxed pylorus in health. The work of Cannon at Harvard and of others, together with the accumulating evidence from the X-rays of adult cases, prove conclusively that the stomach does not empty itself much more rapidly following a posterior gastrojejunostomy. Surgery is using an efficient procedure.

5. Posterior gastroenterostomy does not result in any special impairment of digestion. It occurred to me that these babies, with a definite pyloric obstruction and having a posterior gastroenterostomy stoma functionating, might be utilized for metabolism investigations. Ideal conditions exist in these babies for such an investigation. I was fortunate in securing through Dr. Fritz Talbot careful analyses of the food and feces in the series of cases operated by me and in addition in a series operated by other surgeons. Suffice it to say here that the results in these babies confirmed the findings in adults by Paterson and Cameron. The operation of gastroenterostomy does not materially change the ultimate disposition of fat, carbohydrate and protein.

If to the chemical evidence be added the clinical facts, that all of these babies without exception are thriving and in apparently perfect health, that they have lived several years since the operation was done, have gained in weight, in height and in every way have seemed well and happy, if these carefully observed clinical facts are considered, the evidence is conclusive that in these human babies gastroenterostomy has no ill effect upon metabolism as measured by the digestion of fat, protein and starch and normal growth and development.

6. There is evidence to suggest very strongly that the pyloric tumor persists in these cases, does not materially change. This is not a mere academic question, but one of very considerable practical importance. I have been able through Dr. Dodd, skiagrapher of the Massachusetts General Hospital, to obtain X-rays of babies with a demonstrated pyloric tumor following a posterior gastro-

enterostomy. In every case examined no bismuth is recorded passing the pylorus. All the bismuth food passes from the stomach through the artificial stoma.

From the work of Kelling, von Pflugen, Moritz, Cannon and Blake, Tuffier and Delbet it is a generally accepted fact that, if the pylorus is patent, stomach contents are forced through the pylorus rather than through the artificial stoma. In view of the animal experimental results, the converse is reasonable; if food is seen passing readily through the stoma by X-ray, the pylorus is obstructed. In these congenital stenosis cases the X-ray shows the stoma functionating, therefore, the pylorus, obstructed by the tumor, after the lapse of months and years is still obstructed. The original cause of the obstruction probably persists.

Again, bearing on the persistence of the pyloric tumor after operation, the unique case of Morse, Murphy and Wohlback must be mentioned. The tumor was seen and palpated at autopsy six and one half months after a successful posterior gastro-enterostomy. The tumor existed as at the time of operation. In certain cases, at least, organic infantile pyloric stenosis seems to be a permenant condition. If this be true, the basis for surgical treatment seems to have an important additional reason.

7. The mortality, once high, is decreasing. The first time surgeons attempted to treat this disease was in 1898. From 1898 to 1905 is a period of seven years. During this period gastric surgery was developing. Operative technique was unsettled. The choice of procedure adapted to certain gastric conditions was undetermined. This was an experimental period for gastric surgery in the adult and absolutely a new field in infants. Several different operations were done by many operators. The cases operated upon had gone almost the limit of life under medical experimentation. Is it any wonder that the mortality from surgical operation during this period upon such material was very considerable? The mortality for this period was 46.5 per cent. No apology is needed here for this mortality, for more than half the babies entrusted to the surgeon were saved by operation. Even this was a great improvement over the medical mortality.

Consider now the next six years, the period from 1905 to 1911. The lowering of the mortality under surgical treatment has been remarkable. I have not yet collected all operated cases during this period. I have three groups, however, which are fairly representative of the period.

1. The group of ten operated cases from the Pacific Coast, collected by Stillman. In this group six different surgeons operated. A posterior gastroenterostomy was done in each case. Of the ten cases only one died.

2. The group operated upon by Richter of Chicago. There were nine cases, only one died.

3. My own group of fourteen cases with one death, a mortality of seven per cent. A total, therefore, of thirty-three cases with three deaths, or a mortality of nine per cent.

The mortality of posterior gastroenterostomy in congenital stenosis of the pylorus is low under the above conditions.

Gentlemen, in view of the evidence, I believe that surgical measures should be instituted as soon as the diagnosis of congenital pyloric stenosis is made. Delay is dangerous, because a starving baby rapidly loses its resistance and strength. I believe that skilled surgical treatment of these cases is necessary to save them from impending starvation and to establish the gastro-intestinal tract upon a normal physiological basis.

It is important, when possible, to entrust the postoperative feeding of these little babies to an expert physician or pediatrist.

The pathology of this disease is unique. The clinical picture is usually clear. The indications for surgical treatment are evident. The mortality from surgical operation is low. The results of surgical treatment are usually ideal.

DEPARTMENT OF TECHNIQUE

A METHOD OF TREATMENT FOR HABITUAL DISLOCATION (CONGENITAL) OF THE PATELLÆ

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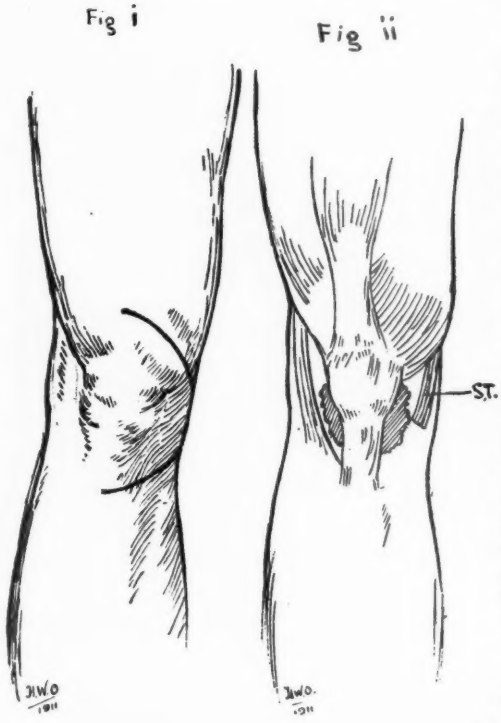
THIS condition, though not of very frequent occurrence, is one which causes a degree of weakness of the lower limbs, and which one may be called upon to remedy as far as possible.

The case I illustrate was one in which the patellæ were markedly displaced outward, during flexion of the knee-joint. The patient was a female, aged forty years, who, though suffering from the deformity all her life, began of late to feel her legs getting considerably weaker and more insecure. Consequently she consulted me with a view to some improvement.

Upon examination I found that each patella showed congenital dislocation, which was evidently in great part due to defective development of the external condyle of the femur, whose trochlear surface showed little evidence of a ridge anteriorly. Thus one could, with the extensor apparatus relaxed, displace the patella outward quite beyond the trochlear surface of the femur, and be able to feel distinctly practically the whole of the posterior articular surface of the patellar bone. During acute flexion of the knee the patella was displaced external to the normal position of the defective trochlear ridge. There co-existed in the patient's legs a degree of genu valgum, also a marked varicosity of both internal saphena veins.



The operation I performed was largely of an experimental nature, and was done in the following manner:

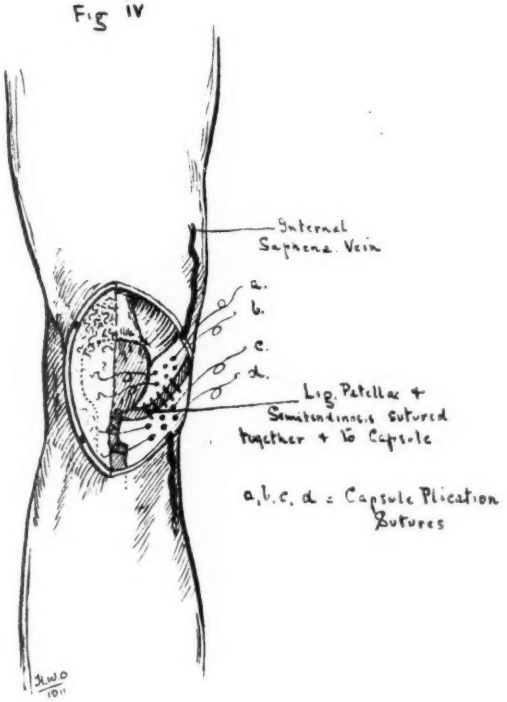
A semilunar skin flap was reflected from the inner and posterior aspect of the knee. The convexity of the incision was directed inward and backward and reached far enough in the latter direction to enable me to reach the semitendinosis tendon as it passed to its insertion. The base of the flap crossed the inner edge of the patella and ligamentum patellæ (see Fig. 1).

After reflection of the flap, the semitendinosis tendon was isolated and cut as near its insertion as one could reach from the lower edge of the incision. I intended to place the tendon across the capsule on the inner side of the patellæ, and join it to the ligamentum patellæ (Fig. 2), but I found the piece of tendon I had isolated was too short for the purpose. I therefore detached a strip of the ligamentum patellæ, as shown in Fig. 3, and brought it inward to meet the semitendinosis tendon. These were then united by suture to each other and also to the inner fascial capsule of the knee, which was then plicated by several sutures. The saphena veins divided by the skin incision were ligatured (Figs. 3 and 4). The flap of skin and fat was replaced and the wound closed by a subcuticular catgut suture. The sutures for the tendons and capsule were of chromic-iodized catgut.

The leg was kept fully extended on a posterior splint for four weeks. The wound healed well. The result was good. It was now found that the

Fig iii

Fig iv



patella was prevented from becoming displaced outward during flexion of the knee and the abnormal lateral displacement which, as already referred to, could be produced when the leg was extended and the extensor apparatus relaxed, was now no longer possible, thus showing, in the first place, the new action of the transplanted tendons, and in the second place, the effect of the capsule plication.

During acute flexion of the knee, before the operation was undertaken, the anterior surface of the displaced patella was directed mainly outward and only slightly forward. Now the patella has almost regained its normal position, and while its anterior surface still shows a slightly outward direction, it looks nearly directly forward. Any outward inclination now present would seem to be explained by the absence of support from below, due to defective development of the femur.

To be quite sure of the result, I allowed the patient out of bed to test the limb for two weeks. She said the improvement was quite distinct, and was willing to have the other limb similarly treated. This was done, and the same operation in every detail was performed. The second wound healed well. It is now a year since the case was dismissed from the hospital, and since then the patient has been working steadily as a factory worker. She says the limbs are much stronger than they have been for many years. Her sisters tell her that she does not "rock" in her walk as she used to do. She ascends a stair now with great ease but still feels a little shaky in descending.

The operation I have described is one which I devised for the case. Kocher refers to the plication of the capsule on the inner side of the patella with satisfactory results in such cases. He also refers to a method, described by Krogius, which promises better results, and which consists in transplanting a long strip of vastus internus with its fascial extension and stitching it on the outer side of the patella. I certainly will try this latter method, should I again meet a similar case, and will compare its result with my own. I am quite satisfied, however, that the operation I have described yields great benefit to the patient, and is not difficult of execution for the surgeon.

TRANSPLANTATION OF THE FIBULA

Report of a Case

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AND
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BELLEMORE, LAURA, age 13 years. Patient was seen first in consultation with Dr. Eugene McCarthy of Fall River.

Past history. Patient complained of pain and discharge from the left lower leg of two years duration. She gave a history of having been taken with severe pain in the left lower leg in September, 1907. The temperature at that time was said to have been 104.4°. The patient was referred to the City Hospital for treatment. There she was watched for several days, and the temperature ranged between 101–104°. In the course of a week a very large, fluctuating swelling was noticed on the left lower leg between the knee and the ankle. This was opened and the pus evacuated. About a pint of greenish pus was removed and a drain was inserted in the leg. The leg was dressed twice a day. It was again opened on account of the continuous discharge of pus. The leg was curetted October 7, 1908, and the wound was drained. The patient was given large doses of iodide of potassium without results. The leg was opened and curetted again on January 7, 1909, and a small amount of necrosed bone was chiselled out; but it continued to discharge.

The patient was first seen by one of the writers April 15, 1909, in consultation with Dr. McCarthy, and the following physical examination made:

A girl, fairly well developed and nourished, weighing seventy-eight pounds. Physical examination was negative, except for the left leg. Over the left tibia there were four discharging sinuses, equally distributed along the shaft. The discharge was a creamy pus. There was no tenderness. When probing the wound, one struck denuded bone. Patient was running a septic temperature. She had been for some months unable to walk on leg.

Diagnosis. "Chronic Osteomyelitis." X-rays taken (see Radiogram No. 1), which showed a rather extensive osteomyelitis of the whole shaft, it being practically a sequestrum, which was honeycombed with sinuses. Patient was observed for some time, and finally operative interference was advised.

May, 1909, ether operation. An incision was made through the skin from over the upper epiphysis of the left tibia to the lower epiphysis. The periosteum of the tibia was found to be one-fourth of an inch thick, and could be denuded by the finger circling under the shaft. At various points in the tibia pus exuded, and at all parts the cortex was very much thickened and ivory-like in appearance. The entire tibia was removed, leaving the epiphysis at either end. Sinuses in the skin were dissected out and the periosteum brought together with catgut. The wound was drained above and below, and plaster-of-paris bandage applied. The wicks were omitted in three days, and the patient made an uneventful recovery. The wound healed in the course of three weeks. The progress of healing was followed by means of X-rays, and no attempt at regeneration of new bone was apparent. The leg was flail-like, the only splint being that of the fibula which made the leg functionally imperfect. It was decided to transplant the fibula into the tibia, which was done by the following technique:

Radiogram No. 1. Shows honeycombed appearance of lower end of the tibia before operation.

November 11, 1909, an incision was made about three inches long between the tibial epiphysis and the head of the fibula. The remaining head of the epiphysis of the tibia was found, and a drill hold made so that the cut portion of the fibula would fit into the socket. The fibula was cut across as high as possible, and transplanted from its normal position into the epiphysis of the tibia. The wound was closed with silkworm gut. Plaster-of-Paris bandage was applied. The patient made an uneventful recovery.

December 31, 1909, a similar operation was done on the lower leg, transplanting the shaft of the fibula into the cup-shaped depression made in the lower tibial epiphysis. The fibula was sawed across as low as possible, and the leg stretched so that the cupping of the epiphysis would not shorten it. The wound was closed with catgut, and a plaster-of-Paris bandage applied. Patient made an uneventful recovery.

The plaster bandage remained on for three months, and at the end of that time it was removed. A light legging was made, and the patient was encouraged to walk. Nine months later the patient was walking about without the aid of crutches, there being about 1¼ inches shortening, and only a very slight limp.

June 22, 1910, the patient had gained thirty-five pounds in weight since the operation, and could jump rope on the affected leg.

A most interesting fact is seen in the accompanying X-ray. (See radiograms Nos. 2, 3 and 4.) This shows the epiphysis of the old tibia, and a marked hypertrophy of the fibula is shown to have taken place in the short period of six months. Patient was discharged from the hospital. She has been seen once since, and is doing well. (See photograph No. 1.)

This operation is one of last resort which can be done when the periosteum does not regenerate a new tibia, as frequently happens in cases of

long standing. The osteomyelitis in this case had apparently been of such long duration and was so extensive that the growing cells in the periosteum had been destroyed, and there was no power of regeneration left, at least none was shown by X-rays. It is, however, an operation that can be done with an assurance of good functional result.

Bone transplantation in its various forms has rapidly increased in efficiency during the last few years. It has been used to fill in defects in long bones due to osteomyelitis and sarcoma, in bone-plasty of the face, in the repair of skull fractures, in pseudarthroses, in the stiffening of paralytic joints by bone pegs, in the repair of a joint by partial substitution, or even in the substitution of an entire knee-joint (1). For summary of the subject in general work we refer to a review by Bucholz (2).

Heteroplasty. Such materials as bones from animals, Schede blood-clot, bone-chips; absorbable material, as catgut, cellulose fibre, sponge, ivory; non-absorbable materials, as hard rubber, metals, plaster, and Mosetig-Moorhof's mixture of iodoform, spermaceti, and oil of Sesami have been used with more or less success, especially the non-absorbable materials in cases of small, aseptic defects. In large defects, such materials are useless (3).

Lexer, who has done much in this line of work, has used hompolastic material from freshly amputated limbs with success. He states as a rule that fresh human bone material, with periosteum and without mechanical or chemical injury, must be used in bone transplantation (1).

Several reports have been made of filling in defects in long bones, due to osteomyelitis and sarcoma, by autoplasty. Janeway transplanted a fragment from the tibia to take the place of five and one-half inches of the ulna, resected for chondrosarcoma (4).

Klapp and Lawen replaced the diaphysis of the humerous, resected for sarcoma by a piece from the tibia (5, 6).

Bittner filled in the defect in the lower half of the tibia, resected for sarcoma with a corresponding piece out from the remaining half of the same bone with good results (7).

Tomita performed practically the same operation (8).

Codivilla transplanted strips of bone from other bones in the same patient, and reported twenty-seven osteoplastic operations (9).

Curtis placed a piece of the fibula, with its muscular and fascial attachments left, into a gap in the tibia (10).

No. 2. No. 3.

Radiogram No. 2. Shows marked hypertrophy of fibula six months after operation.

Radiogram No. 3. Shows union of transplanted fibula with lower epiphysis of tibia.

Senn in a case of ankylosis of the knee, turned a flap with the patella over into the tibia, attaching the patella to the upper end of the lower fragment of the tibia. After union the patella was split lengthwise, and one-half turned and fastened into the upper fragment of the tibia, thus bridging the entire gap (11).

A. Barth has transplanted a piece of the sound tibia to fill in the gap in the other tibia, after resection for sarcoma (12).

Radiogram No. 4. Shows union of epiphysis of tibia and transplanted fibula. Note growth of new fibula from remaining periosteum.

Photo. No. 1. End result with weight bearing.

Other authors report similar free-bone plastic operations.

Of a different type are the cases of Huntington, Stone, and Codman and the one we are reporting in this paper, in that one end of the fibula is attached to the tibial fragment, while the other end is left, temporarily at least, in its normal attachment (13, 14, 15).

Huntington's case was a boy of seven years, who had a defect of five inches in the tibia, after a radical operation for osteomyelitis with only partial repair from the remaining periosteum. The fibula was sawed at a point opposite the lower end of the upper tibial fragment, and then attached into a cup-shaped depression of the tibia. Six months later, to overcome eversion and improve the weight-bearing condition, the lower end was transplanted. Four months later perfect bony union was noted; but there was lateral deformity due to changing the alignment of the tibia outward, on account of walking before the second operation. The fibula was then about the same size as the opposite tibia, and the functional result was perfect even without support, there being only a suggestion of limp. Four years later the joint function at the knee and ankle were still perfect, and there was slight if any limitation of leg rotation.

Stone's case was a boy of five years, who had had an acute dissecting periostitis, destroying the tibia, and one year after the onset had only 1¼ inches of regenerated bone at the top, and a thin isolated bit two inches long further down. The upper end of the tibia was loose and the fibula slightly hypertrophied. He severed the fibula a little above the level of the tibia, and placed the end in a mortise in the end of the tibia. The reflected periosteum of the tibia and fibula were sutured together, and that of the tibia further sutured as a cuff around the upper end of the fibula. Dead spaces were closed by suturing the fascia. Eleven weeks later, there was moderately firm union. Five and one-half months later, the lower end of the fibula was split lengthwise for four inches, making an inverted Y. The inner half was cut across at the level of the lower epiphysis of the tibia and fitted into a small pocket cut in the cartilage. The outer part of the fibula was fractured, which was advisable, to prevent the breaking of the inner part. (Stone further advises doing both operations at once.) Three months later, there was bony union with one and five-eighths inches shortening. One month later, the patient walked freely. The object of

splitting the fibula was to preserve the relations of the outer side of the ankle-joint.

Codman's case was a patient thirty-two years old, who had had several operations for chronic osteomyelitis of the tibia with absence of regeneration of the middle of the shaft. The upper fragment of the tibia was chiselled clean, and after cutting the fibula across a little above the same level and bending the leg outward, he forced the end of the fibula into the spongy part of the tibial fragment. The dead space of the fibula was filled with a portion of the anterior tibial muscle. In a month there was fair bony union. At the end of a year the leg was functionally good, with slight limp due to one inch shortening and stiffness of the ankle. There was not much increase in size of fibula the first year, but after three years it was almost the size of normal tibia.

In addition to these completely reported cases, done in this country, Bobbio reports his case of a boy of ten years, in whom a similar operation was performed to fill a gap left by the removal of the entire diaphysis of the tibia for osteomyelitis without subsequent regeneration (17). The tibial shaft was removed in May, 1904. The upper end of the fibula was transplanted into the upper tibial epiphysis December 19, 1905; the lower end in November, 1906. The marked hypertrophy of the transplanted fibula is shown by X-rays taken eight months and two years after the second transplantation.

Bobbio has collected 35 cases in the literature performed for congenital absence of the tibia, sarcoma with resection of more or less of the tibia, traumatic destruction of the tibial diaphysis, and osteomyelitis with lack of regeneration. He refers to Schloffer (18), who cites Hahn (19) as the originator of the operation.

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OPERATIVE METHOD IN CASE OF INTESTINAL OBSTRUCTION

By AXEL WERELIUS, M. D., Chicago

THE dangers of a resection, or the postoperative difficulties of an artificial intestinal fistula, were happily avoided by using the operative method described below in a desperate case of bowel obstruction.

Patient. A woman forty years of age was brought into Washington Park Hospital, New Year's Day, 1911.

Present history. Three days previous to entrance into hospital the patient was suddenly caught with a severe pain in the abdomen, paroxysmal in character, radiating all over the belly, accompanied by nausea and vomiting; the emesis and retching becoming almost continuous, at first bilious, then fœcal.

Repeated efforts by various methods failed to move the bowels. In short, the patient gave a clear history of intestinal obstruction.

Past history. The patient had suffered from recurrent attacks of abdominal pains, accompanied by nausea and vomiting, for many years, for the relief of which appendectomy at one time and ovarectomy at another had proved entirely futile. She had had typhoid fever fourteen years ago, of a rather severe type. Family history was negative. Habits good.

Examination was necessarily hurried. Face was ashy gray in color, with an anxious expression. Except for a short, hurried thoracic breathing the chest was otherwise negative. Abdomen was greatly distended, very tender, tympanitic and somewhat rigid. No visible peristalsis was seen. There was some gurgling on auscultation. Retching and vomiting at short intervals. Pulse 120. Respiration 32. Temperature 99.4°. Mind somewhat clouded.

Operation. Ether anæsthesia. Incision was made in midabdomen, through the right rectus for about 3¼ inches. On opening the peritoneum there presented at once an enormously distended bluish-black gut. Locating the cæcum, I followed the completely collapsed lower ileum for about one meter, when I encountered the obstruction, a benign stricture. Proximal to the stenosis the bowel was greatly distended and near the obstruction greatly odematous.

After a short deliberation whether to resect or establish a fistula, I discarded both of these procedures and rapidly affixed gastroenterostomy clamps (Fig. 1, b and c) proximal and distal to the stricture (Fig. 1 a). Then I folded the gut on the obstruction, as in Fig. 2, and made a rapid Moynihan anastomosis. Abdomen was then closed without drain.

Postoperative history. We had great difficulty in getting bowel evacuation for several days. Patient's mind remained clouded for an entire week. After this, recovery was uneventful. Wound healed with primary union. To-day patient feels perfectly well. The advantages over a resection by the above method are:

1. Diminished time of operation.
2. No interference with the mesentery, consequently no disturbance of the blood supply and its danger of mesentery thrombosis. This complication would, of course, be specially liable in a case of the type reported above, in which there was complete, or almost complete, stasis at the site of the obstruction.
3. Less difficult operative procedure.

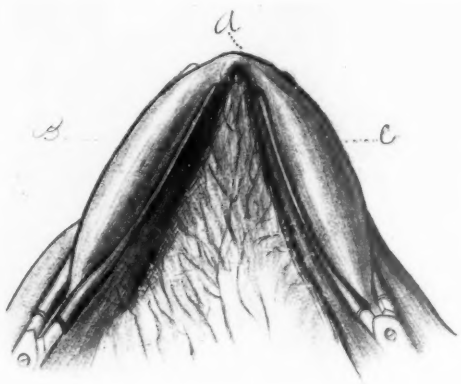

Fig. 1.

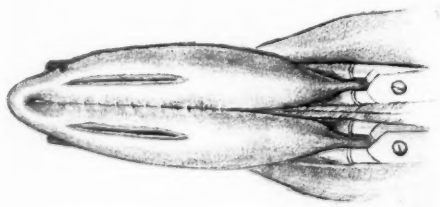

Fig. 2.

TENACULUM FORCEPS FOR HOLDING TOWEL TO PROTECT WOUND MARGINS

By WM. D. BERRY, M. D., Muskogee, Oklahoma

IN constructing these forceps I had in mind the defense against the so-called "stitch abscess" following abdominal operations. This character of infection, in my opinion, where ordinary care is observed in preparing a patient for an abdominal operation, is seldom due to an infection following a needle puncture into the skin, nor is it due to septic material in the sutures used. That statement is borne out in the cases where the skin is closed with a subcutaneous suture of the same kind of material as that used in the cavity of the abdomen, and is also used in closing the other layers of the abdominal wall, when in many instances the patient has no trouble except suppuration in the line of the abdominal incision, and the annoying symptoms which follow, such as elevation of temperature, local pain, head-ache, delay in leaving the hospital, and sometimes a ventral hernia. The abdominal wall is less prepared to defend itself against infection than are most organs in the abdominal cavity, on account of weak resistance of the tissue, due to the scanty blood supply, and in some cases the abundance of fat.

I believe "stitch abscesses" in most cases are due to an infection at the time of operation. It matters not what an operation is being done for, in nearly all cases there is more raw surface exposed in the abdominal wall than to any other tissue while doing an abdominal operation. This tissue is subjected to the trauma of the retractors, the forceps, in fact, all of the instruments used, to the hands of the operator, and his assistant hands; if in doing an operation there is any septic material incountered, either in or out of the abdominal cavity, it has a good opportunity to come into contact with the raw surface of the abdominal wall, unless it is in some way protected. There is also danger of transplanting cells of pathological specimens, which may be found, for which the operation is being done.

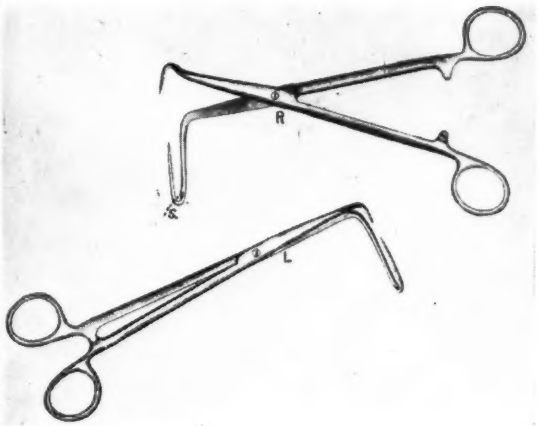

Fig. 1. Two pair of tenaculum forceps. R. for the right hand. L. for the left hand. S. fish-hook like spear on inner surface of loop, made by the curve of long blade.

This instrument was constructed to protect wound margins when operating for any abdominal condition, thereby reducing the danger of infection to a minimum, by holding a sterile towel against, and covering the entire raw surface. The instrument has a long and a short curved blade, both curved at right angles with the long axis of the forcep handles, one pair curving to the right and

Fig. 2. Towel attached to the forceps which are clamped to the abdominal wall. T, towel hanging from its attachment to forceps. A.W., raw surface of abdominal wall.

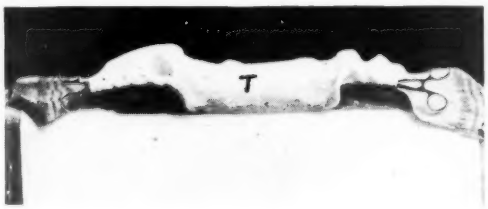

Fig. 3. Raw surface covered, forcep handles out of operator's way. T, towel turned over forceps blades which are held in place by the forceps.

the other to the left, and on account of this curve the handles of the instrument can in no way interfere with the operator. The blades are round to prevent their cutting the tissue, when in use. When applying the instrument, the point of the long blade is first stuck through a towel near its center, about one inch from its selvage edge, and then clamped on the abdominal wall near each angle of the incision, the long blade starting from the peritonæum. The forceps are made in right and left, and two pairs are applied to each side of the incision, after passing through the towel, as described. (Fig. 2). The towels are then turned back over the forceps to which they are attached, which covers the raw surface on each side (Fig. 3). On account of the short fish-hook like spear on the inner surface of the loop of the long blade, the towel cannot slip up the forcep blade or away from the peritonæum (Fig. 1).

A CASE OF DEATH UNDER NITROUS OXIDE–OXYGEN ANÆSTHESIA

By JOHN OLOW, M. D., Lund, Sweden
(From the Surgical Department of the University Clinic. Prof. J. Borelius)

WHEN you try to get an appreciation of the mortality under nitrous oxide-oxygen anæsthesia, you will find only few cases mentioned in the literature where death has occurred during that sort of narcosis. Beltrami (1), in his dissertation, which appeared in 1905, "après des recherches aussi laborieuses que méticuleuses," has found only about ten cases of that kind, and after excluding such cases where evidently death has been caused by mental shock, incompetence of the anæsthetist, etc., more than by the anæsthetic medium itself, there remain "à peine que 5 cas, dans lesquels l'influence de l'agent anæsthésique pourrait peut-être être accusée." Though this number, assigned by Beltrami, is too small — he does not mention, for instance, cases reported by Nussbaum (2), Owen (3), Adams (4) and others — yet the cases related of death during the administration of that medium are few enough to make it justifiable to give a somewhat more detailed account of every new one.

In the surgical clinic at the University of Lund, where during many years ether, administered by drops on an open mask, has been almost solely used for general anæsthesia (during the last two years preceded by a hypodermical injection of scopolamin-morphine), this year nitrous oxide-oxygen has been administered a few times — in all thirteen. The apparatus employed is that designed by Weller. The cases where this sort of anæsthesia has been used, for the most part, are such where other sorts of narcosis for some reasons have been judged countraindicated, such as cases of senility, advanced cachexia, tuberculosis, pulmonum, arterio-cardiosclerosis, excessive fatness, etc. One patient died on the operating-table. I shall relate the case briefly:

On October 2, 1911, G. T., a tailor, 53 years of age, was received into the surgical department of the hospital, requesting relief from a free body in the right knee-joint. Of his antecedents he told as follows: He always had been sound and vigorous, but being very stout for several years, he had been troubled with shortness of breath when working hard.

As the patient presented clear signs of emphysema and cardiosclerosis, and was of an uncommon stoutness (his weight was 130 kg.), there was not little hesitation as to operating him. But the patient himself insisted upon operation, being, as he thought, quite an invalid owing to these over-and-over repeated attacks. He was informed of the dangers of an operation, and declared that he fully understood it; so the day was fixed for operation at October 13th. In the following days, when waiting, he was prepared with stimuli to the heart.

In order to diminish the risk of the narcosis as far as possible, nitrous oxide-oxygen was used. Half an hour before the commencement of the narcosis a hypodermical injection of a little more than a centigram of morphine was given. At 9.30 A. M. the gas administration began. As usual, at first a mixture of gas, rich in nitrous oxide, was given, the indicator of the regulator being turned to 1–2; then by degrees a mixture, richer in oxygen, the indicator at 6–8. The patient was breathing regularly and without effort; the pupils were a little above the average size; the face was slightly bluish; the action of the heart was equal and vigorous. At 9.33 A. M. the anæsthesia was not yet very deep; he moved a little, and twice or thrice he opened the eyes spontaneously; the pupils were still a little above medium size and answered on exposure to light. Suddenly, while the indicator was at 8, he became profoundly cyanotic. The indicator at once was moved to pure oxygen, but the patient ceased to breathe and feeble spasms were observed in the legs. Artificial respiration was induced immediately, while the face-piece was held to the face, the regulator on pure oxygen; ether was given in hypodermical injection, but at the end of about half a minute the cyanosis turned into an intense paleness and no action of the heart could be perceived. The artificial respiration was continued for a long while, but without any result. The heart had definitely ceased to beat; and, besides, it was impossible to get any air to pass through the nose or mouth, though the tongue was held well out (as it had been through the whole narcosis), and no other impediment to the respiration could be detected.

Postmortem examination was performed by Prof. J. Forssman twenty-six hours after death. The face was cyanotic, as well as the whole back side of the body. In both ventricles of the heart there was some gas (certainly from putrefaction, the endocard and the intima of the aorta being imbibed with blood) and dark liquid blood; besides, there were some coagula in the right ventricle. Both ventricles were dilated. No vitium organicum. The myocard was on its thickest about 1½ cm. in section, dull and slightly brown; no fibrous spots were found in it. The weight of the heart was 800 gr. The arteriæ coronariæ were sclerotic to a vast estent. The upper half of the aorta was considerably altered; the lower half was normal. The altered half was rugose on the inner surface, with close lying hyaline plaques, some of which were confluent and calcareous; in others there was ateromatous decomposition; on one place this alteration was advanced to that extent that the ateromatous mass lay exposed against the lumen. (Diagnosis: aortitis luetica.) The introitus laryngis was very cyanotic; the rima glottidis was narrow, the vocal chords lying almost close up to each other. The tongue, as well as the other parts of the throat and mouth, were not œdematous, but, in accordance with the patient's average habitus, large and flabby.

In making an epicritical examination of this case, the question first arises as to the anæsthetic medium employed — was it really nitrous oxide? And pure nitrous oxide? That gas (N_2O) is, as is well known, produced by heating ammonium nitricum up to about 170°C. But when you chance to heat it too much, nitric oxide (NO) is built as a by-product, and that gas is of the utmost toxicity. Now, for instance, one might think, that the contents of our gas cylinder were made impure in that manner; this being so, we would have to deal with a case of intoxication by nitric oxide, and not with a case of death from nitrous oxide anæsthesia. However, the professor of medical chemistry at the university here, Dr. I. Bang, two days after the fatal narcosis, was friendly enough to perform an analysis on some gas from our nitrous oxide-gas cylinder, which had been in the meantime well closed and unmoved. The result of his analysis was pure nitrous oxide.

Next the question is to be answered: Is there any objection to be made to the administration of the anæsthetic medium? As the number of our nitrous oxide anæsthesiæ is an humble one, we have but little experience in that sort of narcosis. Yet, in this case the gas was administered in like manner as in the other cases, where the narcosis has proceeded quite satisfactorily and free from threatening accidents, and in administering we followed, as exactly as possible, the directions given by such persons as have evidently a considerable experience in those things (Teter, Gwathmey [6], and others). At no time was nitrous oxide given unmixed, but all the while oxygen was added to it, not less than one to two per cent, and early enough to an amount of seven to eight per cent. The bluish color of the face was, until the deep cyanosis appeared, no more marked in this case than it had been in our other cases. The respiration and pulse also were both irreproachable till the appearance of the cyanosis. There can, I think, not be talk of having given too much of the nitrous oxide.

But in another respect perhaps an objection could be raised; the patient had received a dose of morphine before being anæsthetized. Now, the morphine is known to act depressively on the excitability of the respiratory centrum, as also Teter has observed during his working as an anæsthetist: "The respiration is more apt to cease" and "it is much harder to re-establish respiration than if morphine had not been used." (5). Possibly, that centigram of morphine which was given to our patient, can have been of some influence in facilitating the appearance of asphyxia and rendering the attempts at reviving more difficult.

Be as it may as regards the action of the morphine, another factor seems to have been of more influence on the coming up of asphyxia. In an article in Brit. Med. Journ., 1909, vol. ii, p. 201, Threwby calls attention to the fact, that obstruction of free breathing in nitrous oxide anæsthesia is often due to the lessening of "the oro-pharyngeal aperture," which is caused by the tongue's swelling up under influence of the slight cyanosis of the gas administration. Especially is this the case in patients who have a large, flabby tongue. As it was in our case: at the postmortem examination the different parts of the mouth and throat, the tongue, the soft palate, the tonsils, etc., were still large and flabby; of course, it was still more so in vivo, and under the narcosis certainly the oro-pharyngeal aperture was narrowed to a high degree. No doubt the explanation for the deep cyanosis and the soon entering apnoë is to be sought in that circumstance.

But the patient did not die purely *asphyctico modo*, the symptoms of asphyxia very soon (as mentioned, in about half a minute) giving place to the signs of syncope. The result of the postmortem examination leaves the explanation: aortitis luetica, secondary hypertrophia of the heart, advanced cardiosclerosis, degeneration of the myocard. A sound heart does not stop because of an obstruction to the free breathing of half a minute; a heart with those alterations does not need more increase of its labor than that caused by such a short-lasting apnoë, to break off its action.

At last a few words on the indication to the operation and on the measures taken during the narcosis. A person with such a stature and such alterations of the organs as shown by our patient is not, to be sure, a fit subject for an operation under general anæsthesia. But, as I have mentioned, there was no chance of removing the body under local anæsthesia; the patient, remembering the happily performed and successful little operation some years ago, perhaps did not appreciate enough the dangers of an operation, declared himself willing to expose himself to any risk in order to get rid of his suffering and regain his ability for work, which lately had been practically none. Under those circumstances, it was judged not justifiable to refuse operating him. Finally, as regards the measures during the narcosis, perhaps the objection could be made that tracheotomy ought to have been performed when the artificial respiration did not meet with success. Theoretically, this remark is justified. But practically the situation was such that, as a matter of fact, a little while passed away before it was evident that the efforts to re-establish respiration were not successful, and then the heart already had ceased to act. And even if tracheotomy had been performed at the very moment when respiration stopped, certainly it would have been too late, as the action of the heart ceased, at the latest, three-quarters of a minute after the cessation of respiration.

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DEATH FROM NITROUS OXIDE AND OXYGEN ANÆSTHESIA

BY CHARLES E. BOYS, M. D., KALAMAZOO, MICHIGAN

THE patient was a boy, nine years of age, who entered the hospital for hernia operation. He was of healthy appearance, but not especially robust. About two years ago his tonsils were enucleated and his adenoids removed under ether anæsthesia, given by the warmed-vapor method of Gwathmey.

The physical examination just before operation was negative. Several days before, he had had a cold, but the operation had been put off until this had subsided. Nitrous oxide and oxygen anæsthesia was chosen because of its having been reported as the safest anæsthetic.

The anæsthetic was started at 9:45 A. M. The operation was begun at 9:50 and was finished, all but a few skin clips, at 10:15, when the patient ceased to breathe. The anæsthesia was so light that patient had to be held at times, and was at no time deeply cyanosed. There was no sterterous breathing. The pupils dilated early and remained so until the end. When respiration stopped the skin color was good, but the heart action was very bad, being difficult to determine with stethoscope.

The nitrous oxide was removed at once and oxygen alone given. Ten minims of $\frac{1}{1000}$ adrenalin chloride were given hypodermatically, supposedly into the heart muscle. The heart action promptly improved and good color returned with artificial respiration. The anus was dilated but the sphincter was relaxed and there was very little response. Later, other hypodermic stimulation was given, camphorated oil, atropine, and brandy. Aromatic spirits of ammonia were given by inhalation.

At 3:30 the pulse was becoming irregular and weak, but the color remained good as long as artificial respiration was kept up. This was stopped at times, until cyanosis appeared, and then resumed until return of good color, but there was no attempt whatever at respiration. At 3:00 P. M. carbon dioxide and oxygen were given, according to the plan of Henderson, until deep cyanosis appeared, then stopped until good color returned. This was repeated fifteen or twenty minutes later, but without any improvement.

From this time the heart became weaker until 4:00 P. M., when it was no longer perceptible. Artificial respiration was kept up, however, until 6:00 P. M., when rigor mortis was present in the extremities.

Outside of the fact that we believe the patient died from what has been considered the safest of all anæsthetics, the points of especial interest are the absolute failure of respiration and the persistence of heart action for six hours following.

AN ADENOMYOMATOUS UTERUS REMOVED DURING MENSTRUATION SHOWING THE OCCURRENCE OF MENSTRUATION IN THE ADENOMATOUS ISLETS[1]

By W. BLAIR BELL, B. S., M. D., Liverpool, England

MISS A. W., aged 30 years, was seen by me in consultation on February 21, 1911, when she gave the following history: Menstruation commenced at 15. Cycle $\frac{5}{28}$ days. No pain. General health had always been good until three years ago, except for occasional attacks of vomiting during the last 9 years, together with a feeling of discomfort in the hypogastrium and vagina. She also stated that she had passed gravel. The bowels had always been regular. Three years ago the catamenia became more frequent — cycle $\frac{4}{21-28}$ days — with bad menstrual (second day) aching pain. Two years ago she was curetted by a gynecologist for backward displacement. She received no benefit from this operation. On examination *per vaginam* I found a large, hard mass in the pouch of Douglas; this was fixed and immovable. The cervix was high up and pointing forward. The lump felt was evidently connected with the uterus, and a diagnosis of fibromyoma uteri with retroversion was made. The operation was performed two days later. The patient commenced to menstruate the night before the operation, so that this was carried out on the second day of the period.

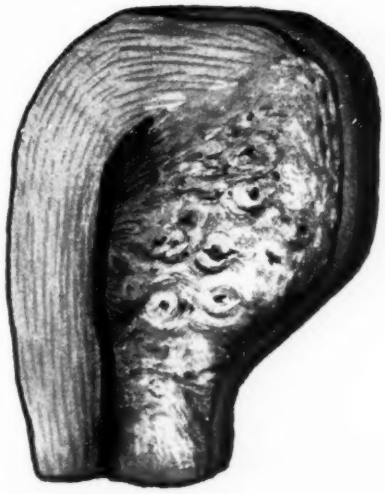

Fig. 1. View of uterus divided sagittally. The adenomyomatous tumour is seen in the posterior wall.

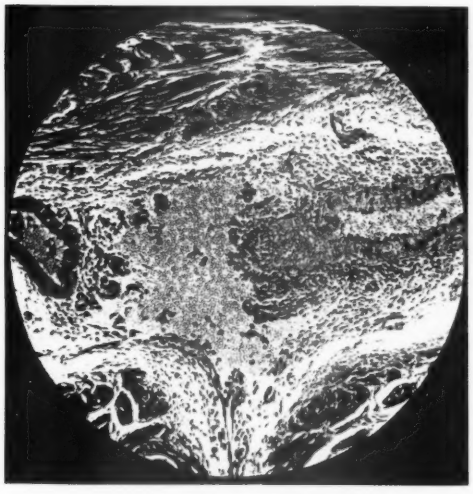

Fig. 2. Adenomyoma uteri showing menstruation occurring in adenomatous islets.

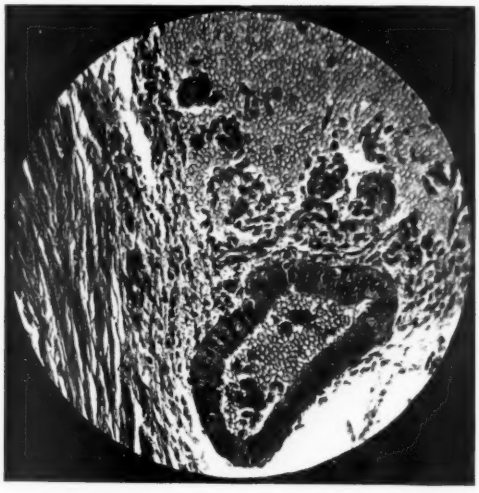

Fig. 3. Adenomyoma uteri showing menstruation occurring in adenomatous islets.

[1] Read before the North of England Gynecological Society, December 15, 1911.

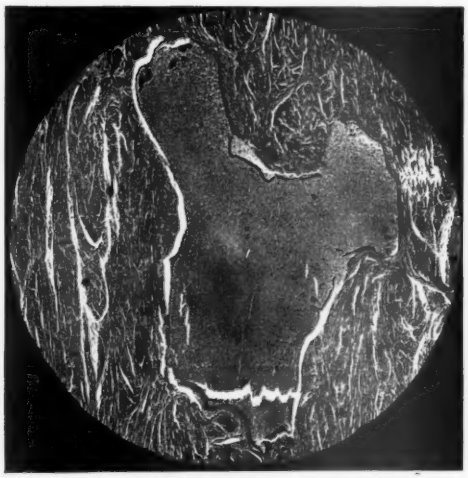

Fig. 4. Gland distended with blood.

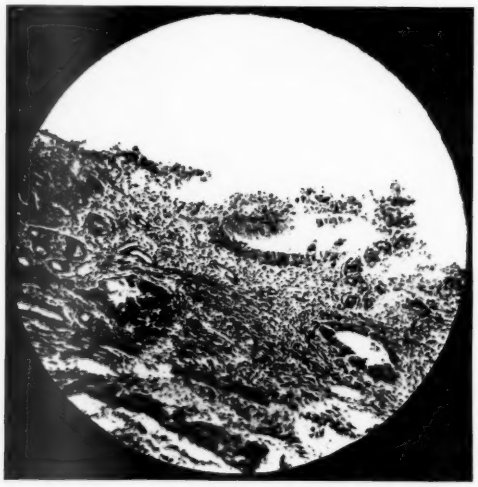

Fig. 5. Adenomyoma uteri showing menstruation occurring in the uterine cavity.

Through a subumbilical incision the uterus was found retroverted, and adherent to the rectum in the pouch of Douglas. After the adhesions had been separated it appeared that one had to deal with an ordinary fibromyomatous uterus, and this was removed by supravaginal hysterectomy. The right ovary and tube were also removed. No corpus luteum could be found in either ovary. The patient made an uninterrupted recovery.

EXAMINATION OF THE SPECIMEN

On cutting through the uterus in sagittal section it was seen that in the posterior wall there was a tumour, of the size of a hen's small egg, to which there was no definite capsule. The cut surface of the tumour exposed a large number of dark spots which had the naked eye appearance of thrombosed veins. (Fig 1). The histological examination showed that the tumour was an adenomyoma of the usual type, but that the dark spots represented the islets of adenomatous tissue in the process of menstruation, and filled with blood. (Figs. 2 and 3.) In some places the glands were seen to be enormously distended with blood. (Fig. 4.) The endometrium of the uterine cavity also showed menstruation in progress. (Fig. 5.)

It was impossible by coarse dissection to trace any connection between the adenomatous islets and the uterine cavity, although such must exist for the blood present is recent. I do not think that menstruation in progress has been demonstrated before in the glandular islets of an adenomyoma, although Cullen in his monograph on adenomyomata of the uterus frequently alludes to the retention of menstrual fluid in the adenomatous islets.

REPORT OF A CLINIC[1]

Being a Report of Certain Cases with a Discussion of Technique

By J. M. BALDY, M. D., Philadelphia

THE first case to be brought before you to-day is one of a *left ovarian cyst* of the size of a full-term pergnancy. The woman's mother was operated upon by the late Dr. William Goodell, some twenty years ago, for a similar tumor and is alive and well to-day. From inspection of this tumor you will readily see that it grew from the left side; fluctuation is most marked, as you observe it is freely movable, and from its general characteristics independent of a vaginal examination which seems unnecessary especially in view of the natural history, it is clearly a left-sided ovarian cyst. The woman suffers no symptoms whatever excepting those due to its size, and this is further corroboration of the diagnosis. You will observe, gentlemen, how readily one may be mistaken in intra-abdominal neoplasms. This tumor is undoubtedly not an ovarian cyst, but an enormous cystic kidney, and you can easily see the whole descending colon running over its surface with all the mess-colon vessels radiating from the colon to both sides over the entire surface of the tumor.

Fortunately we have the laboratory report on the urine, which is negative, and as we find a healthy right kidney we will proceed and enucleate the diseased one before us. Now, that the kidney is removed and the ureter and blood-vessels ligated, you will observe the fortunate lack of oozing from the wounds. In consequence of this we will merely allow the soft tissues of the abdomen cavity to fall into place, as you see they readily do, without the introduction of stitches, and will close the wounds without drainage of any kind.

The second patient is one suffering from a *fibroid tumor of the womb*, multi-nodular and hard. The usual history of bleeding and pain obtains. The mass as you see has grown to be about the size of the head of a year-old child, it is quite immovable and is probably bound down by adhesions due to old disease of the adnexa. The enucleation may prove to be a bit difficult and slow. The removal of the tumor mass, plus the fundus of the uterus, by the usual amputation at the neck method is completed, as you observe, and ordinarily we would be ready to close the abdomen, but what you have probably not observed and what I have not mentioned up to the present moment, is that during the course of this tremendously difficult enucleation we have torn open the lower sigmoid or upper rectal portion of the great bowel, the rent being fully an inch in length; we could readily slip a small hen's egg through the opening, as those of you who are near may see as I expose its ragged edges. The accident might possibly have been avoided, but I can hardly see how, if the tumor was to be removed, the adhesion being so extensive and tough and there being so little space to work in between the tumor and the pelvic bones. If it were to be, I am glad it occurred just at this particular time, as it will give us the opportunity to demonstrate to you how we deal with such conditions. Years of experience have taught us not to worry over such complications, the main thing for the surgeon to do being to keep his head and not become rattled, the welfare of his patient depending on his skill and coolness in the emergency.

The difficulty with these lacerations oftentimes is their situation in the depth of the pelvis and the infiltration of the bowel itself with inflammatory products. This type of adhesions (old and without infiltrates but in consequence widespread and tough), while they are very difficult to separate, yet the mere absence of infiltrates makes it correspondingly easy to deal with the tear in the bowel, because it allows of fairly free exposure of the injured part and gives solid, healthy tissue into which to introduce the sutures. A running catgut suture unites the torn edges and a second continuous suture securely turns the first row into the bowel. The oozing bleeding in the pelvis is now practically stopped by the prolonged exposure to the air and we will proceed to close the abdominal walls without drainage. The sphincter ani muscle will be thoroughly stretched and a one-grain suppository of opium slipped in the rectum, a second opium suppository will be introduced in three hours and after that whenever the patient shows any tendency to pain she will receive a hypodermic of morphia until it ceases. The bowels will be kept in splints, as it were, temporarily, and in about four days will be moved by a mild laxative. We

[1]Held during the Clinical Congress of Surgeons of North America, Philadelphia, November, 1911.

anticipate no difficulty whatever in the convalesence of the patient.

The third case will be another one of *fibroid tumor of the uterus*, a much smaller mass, and we will hope for a simple, easy case so as to be able to demonstrate to you the routine steps without complication. Here again we have been disappointed, but what has been our loss is a third time your gain. Another complicated case, this time an intra-ligamentary fibroid which had, on examination, a fair abount of mobility, but which has had to be completely enucleated from the folds of the broad ligament. You will observe now that the enucleation is completed; that the ureter on the right side is as thick as a large lead pencil and is exposed from above the ileo-pectoneal line to the point it enters the bladder and you will observe its full length, at least five inches, which had to be stripped off the tumor. You will also observe the large iliac vessels are exposed for fully three inches down to their coats. However, neither the vessels nor the ureter are injured, and we have no fear of the result.

The dissection was difficult and delicate while it lasted and we are free to confess we are glad it is safely over. As much peritoneum as possible will now be gathered from any and every direction in order to cover, as well as may be, raw surfaces, and the abdomen will again be closed without drainage. As you will have observed, we have done away with drainage of any kind in our work, have merely mopped out the peritoneal cavity with the aid of sponges wherever soiled with blood and have not even introduced salt solution. We follow this practice as nearly as possible in all cases.

Now, gentlemen, I am perfectly conscious that there are certain points in our technique, as we have demonstrated these operations to you, which you are criticizing and which it behooves us to explain or you will carry the criticism away with you. And it is an easy guess, first of all, that you are wondering how, in the face of the great trend of modern surgery, we dare continue to *operate with bare hands*. Allow me to put the matter to you in this way:

If *we* are able to operate with bare hands successfully, are we far wrong when we say that the surgeon who is unable to clean his skin to a sufficient degree of safety for this work is a dirty surgeon? And the one who will not take the proper pains to so cleanse himself will neglect other and equally important points, and is it not unsafe to allow him to perform surgical operations? We offer no complaint against the man who wears rubber gloves, if he so elects, but before he criticizes us for electing to operate without rubber gloves we demand that he demonstrate that he can produce better results than we are able to produce, as far as infection is concerned. If there be any danger of germs coming from the deeper layers of the skin epithelium, that danger is greatly enhanced by the maceration of the hand encased in rubber, and then should a tear or puncture of the glove occur, the hand is far and away more dangerous than if uncovered. The mechanical protection of the rubber exposes men to the acquisition of great carelessness in the cleansing of the hands before putting on the glove, and in case of puncture again a more emphatic element of danger obtains. This is especially true in the case of the coming generation of surgeons who have not gone through the problems which have taught us older men the great importance of not neglecting the smallest element in our technique. You will ask how the egress of the germs from the deeper layers of the epithelium can be prevented during the course of the operation, even though the surface may be primarily rendered safely aseptic. We make no pretense whatever that we do prevent their egress; we admit we have never tried to find out if this occurred or not. The laboratory has demonstrated that these germs do exist, but no one has come forward yet who has cultured these same germs and has, by inoculation, shown that they are in the slightest degree dangerous to wounds. The assertions to this effect, if any such obtain, are purely theoretical. On the other hand, our experience has taught us one of two things, viz., that the germs never appear during the performance of the operation, or if they do appear, they do no harm whatever. Consequently we have long since learned to regard them of as little consequence as the germs in the air.

You may say, but every other person but yourself concerned in the operation has his or her hands protected by gloves! I can only answer that I am able to assure my own personal cleanliness, but how can you expect me to answer for the cleanliness of those who, following your teaching, are afraid to answer for their own cleanliness? Then, again, nurses and internes in hospitals have not the same opportunity to keep away from infectious matter as we can who do not live in hospitals. After all, the final test is results. Most of my surgical work is done in the Gynecean Hospital and in the Polyclinic Hospital, the one a special, the other a general hospital. The records are kept by the employees of the institution and the surgeons have in no way control over them. With one exception, all the

surgeons use rubber gloves but myself. The exception uses them part of the time, at other times does not. The mortality records at the Gynecean Hospital stand for the past three years as follows:

	1908–09.	1909–10.	1910–11.
Low	3½%	1⅓%	4⅛%
Average	4½%	3 3/19%	4%
My own	0	3 1/13%	0

This gives bare hands an average mortality for these three years of about 1⅓ per cent as against from 3 to 4 per cent for rubber gloves. This record is only quoted to sustain our position as to infections, and it certainly does that most emphatically. Our morbidity record is equally as good. If, with bare hands, we are able to produce such results we are at a loss to see how anyone can further criticize the method. Certainly not those who cannot equal the results. In the Polyclinic Hospital, where we now stand, I am not aware of having had a single death for over two years, and this in spite of the fact that it is a general hospital. An accurate percentage comparison here would probably make a better showing for bare hands than in the Gynecean Hospital. To tell the truth, gentlemen, I am not in the least concerned in your presumed criticism on this part of my technique. Can you blame me?

Some of you have asked me as to the use of silk ligatures in the ligation of vessels, which is a part of our technique. We can only say that it is habit. We have always used silk for this purpose. We sleep well with the knowledge that the vessels are secure and in ten years we have heard subsequently from the silk in but a single patient, and for that there was special reason. In secondary operations we never find the silk used at the primary operation, and we feel that it is as surely taken up as is catgut, although not so quickly perhaps. Simultaneously with the end of drainage all our difficulty with silk disappeared. Had we been hearing subsequently from our silk we should long since have abandoned its use; the fact that we still continue with it is sufficient proof that we have no trouble with it. Our patients and the doctors who send us our work are the same as are your own, and neither of them would stand for infections or ligatures which sloughed and which gave painful stumps. Here, again, results make us quite content in the face of the assertions of the advocates of catgut. We would call your attention to a few other points in our technique on which we place considerable importance: the few instruments in use; the few sponges in use; the fact that a sponge is never laid down on the table but is invariably returned to the sponge nurse when not in actual use; the fact that an instrument is rarely used or laid down without the hand holding it being carried through a basin of sterile water standing at our side, and the fact that clamps and forceps are never left hanging on the tissues in the wounds. With few instruments one can handle them one's self and thus dispense with an extra assistant or nurse. The instruments can be quickly found and as quickly picked up, and as they are constantly in use it is not possible for one to be lost without being instantly missed. It has been our luck never to have replaced a patient in bed with an instrument or sponge in the abdomen. The constant washing of the instruments keeps them always clean when picked up for use and is a great protection to both the patient and one's self from infection. The elimination of all clamping instruments from the wounds prevents too much crushing of tissues and makes largely for quick and sure healing. We are fully convinced that many wounds fail of union from this cause. We are firm believers in the efficiency of through-and-through silkworm gut sutures for the abdominal wound, but we supplement them, as you see, by a running catgut suture to secure the approximation of the edges of the fascia and finish treating the wound by a similar running catgut suture applied to the skin edges.

Note. The results of operations performed at the recent session of the Clinical Congress of Surgeons in Philadelphia should be of prime interest to those who witnessed them. Personally, we performed twenty-two (22) operations, mostly of a major character, during the session. All of these have made good recoveries, and what is of equal importance in view of the technique, in but a single instance has there been so much as a moist stitch-hole.

TREATMENT OF GUNSHOT WOUNDS OF THE ABDOMEN[1]

With Report of Seven Cases

By FRANK B. WALKER, M. D., Detroit, Michigan

IN the consideration of this subject I wish to affirm at the outset that in the past too much deference has been paid to military surgery. I am neither ignorant nor forgetful of the effects of battlefield injuries without and with operation as it has been administered, but I am convinced that in civilian surgery at least, the same methods and principles should now be adopted in gunshot wounds of the abdomen as apply in similar conditions from other causes.

Formerly, when the gravity of an abdominal operation was about equivalent to that of the injury, expectant treatment was justifiable. Now, however, conditions are changed. In all large cities and in many small ones hospital facilities are at hand to insure prompt and safe surgical measures.

In the presence of a diagnosed rupture of the gall-bladder or of a pregnant tube or of a perforating ulcer of the stomach or bowel there would be no delay in operative interference. Neither should there by any hesitancy in rendering the same aid in penetrating wounds of the abdomen, inasmuch as they are practically synonymous with intestinal perforations. Now not only has "masterly inactivity" in these cases no longer a place, but operation at the earliest possible moment must be the rule if the victim is to have the best chance of recovery.

It must be admitted that such operations are both dangerous and difficult. There may be two perforations or twenty, and it may be that some are not found. The fact remains that such cases are desperate, but less so with operation than without.

To substantiate this position it is not necessary either to report my cases or to refer to the opinions and work of other surgeons, but it will be interesting and may be profitable to do so.

Forty years ago that great man, Sims, advocated exploratory laparotomy and declared:[2] "The danger consists not in opening the abdominal cavity but in keeping it closed, and the day will come when gunshot and other wounds of the abdomen and perforations of the intestine will be treated by opening the peritoneal cavity and washing out or drainage of the septic fluids."

[2] Quoted from Gyn. and Abdominal Surgery, Kelley and Noble, Vol. 2.

Medical history records isolated instances of surgical intervention in the first half of the last century, but opinions were unequally divided. In 1890 T. S. K. Morton[3] collected 94 cases operated upon by 68 American surgeons. Since then several have recorded small groups of personal cases.

In 1896, W. E. Parker[4] reported 13 cases personally operated upon with seven deaths, a mortality of 54.6 per cent, and a collection of 145 cases operated upon with a mortality of 53.1 per cent. That was in striking contrast to the 90 per cent mortality that has been observed to follow usually gunshot wounds made by large-caliber, low velocity bullets, without operation.

In 1898 H. H. Grant[5] reported four personal cases operated upon within seven hours, with one death. He stated that in penetrating wounds of the abdomen the intestines will be injured in 73.2 per cent of cases and the intestines or solid viscera in 99.8 per cent, and advised immediate operation.

In 1903, J. Y. Brown[6] reported 23 cases operated upon with 19 recoveries, a mortality of 17.4 per cent.

In 1905, R. Winslow[7] reported 29 cases. Of 5 cases without operation 4 died, 80 per cent. Of 25 cases operated upon 9 died, a mortality rate of 37.5 per cent.

In 1906 G. T. Vaughan[8] reported 14 cases of gunshot wounds of the peritoneal cavity. Twelve were operated upon in from one to 28 hours after the injury. One was operated upon late. Six died from hæmorrhage, one from peritonitis, one from exhaustion, and one from shock.

In 1908 McRae[9] reported 47 cases of penetrating wounds of the abdomen in the Grady Hospital, Atlanta, from July, 1899. Sixteen of them were not operated upon and the mortality was 62.5 per cent. Thirty-one were operated upon by eight different surgeons and three house surgeons (internes) with a mortality of 25.8 per cent.

[3] Journal American Medical Association, 1890.
[4] Southern Surg and Gyn. Transact., 1896.
[5] Southern Surg. and Gyn. Transact., 1898.
[6] American Jour. Obstet., 1903, xlviii.
[7] Jour. Amer. Med. Assoc., 1905.
[8] Jour. Assoc. Mil. Surg., 1906.
[9] Gynec. and Abdom. Surg., Kelley and Noble, Vol. 2.

[1] Read before the Wayne County Medical Society, October 9 1911.

McRae had 16 personal cases. Five were treated expectantly with four deaths. Eight had early operations with one death. Two late operations were done for complications due to penetrating wounds that might have been prevented by early operations. His total mortality from cases operated upon was 36.5 per cent.

In the same year, 1908, G. G. Holloday[1] reported five cases, in which recovery followed operation in four, and in a note added two subsequent with operations and recoveries.

During the past two years, I have operated upon seven cases of gunshot wounds of the abdomen with one death. In the fatal case I found eight large perforations of the small intestine and considerable fæcal matter exuding therefrom. Following the operation he did fairly well until fed surreptitiously by visitors. He died on the fourth day.

The treatment of a gunshot wound should begin as soon as it is made, by applying a protective dressing. The history of the deed should then be inquired into, including the relative positions of both perpetrator and victim, to learn the probable direction of the missile. If there is any possibility that the wound penetrates the abdominal wall, the patient should be prepared for an immediate operation. If there is any doubt then that the wound is penetrating it should be laid open and traced to a satisfaction on this point. If the wound is penetrating a laparotomy should be performed with the object of examining and repairing the structures possibly injured in the course of the bullet into or through the body. Such a procedure usually means the recovery of the missile or the examination of the wound of exit as well as of entrance.

Upon opening the peritoneal cavity blood will usually run out at once. The viscera should be handled gently, as in any other laparotomy. Bleeding tissues should be sought and ligated if possible or treated with compresses, and lacerations of the viscera repaired after modern methods. I personally have not washed out the peritoneal cavity. In order to cleanse lacerated intestine of fœcal material I have at times laid the viscera outside of the body and douched them, providing against the fluid running into the abdominal wound. Good drainage is advisable in nearly all cases, either tubing or gauze or both.

The after-treatment is not necessarily different from that in any similar laparotomy.

The following is a record of seven cases that have occurred consecutively in my practice since August, 1909. I am indebted to Dr. Howard R. Coll, resident surgeon at St. Mary's Hospital, for the histories of the cases, and to Dr. G. C. Chene for X-ray examinations.

[1] New York Med. Jour., Sept. 26, 1908.

Case 1. E. W., colored, age 21, was shot through the right loin August 16, 1909. He walked a mile after the injury and was operated upon four hours later. The bullet entered the back, one and one half inches to the right of the spinous process of the second lumbar vertebra, passed through the lower pole of the right kidney and lodged under the skin near the anterior extremity of the tenth rib. The bullet was recovered and the abdomen opened into a pool of blood. The track of the bullet was traced posteriorly through the mesentery to the perforations in the kidney. The bleeding structures were ligated and the anterior rent in the kidney sutured. No perforations were found in the hollow viscera. A rubber tube was placed deeply in the wound and surrounded with hydroscopic gauze and the opening otherwise closed. The posterior wound was enlarged and provided with similar drainage. The urinary function of the kidney was not disturbed. The patient had a tedious convalescence, but recovered perfectly and left St. Mary's Hospital on the fifty-third day.

Case 2. Mrs. S. S., age 38, was shot five times, July 9, 1910. She was operated upon within six hours. Examination showed a bullet wound of the scalp near the line of the left front-parietal suture. The skull was intact. There was one perforation of the left arm three inches above the elbow and another of the left forearm the same distance below the joint, the wounds of entrance being on the posterior surface. A fourth bullet entered the back, two inches above the left ilium and two inches to the left of the spinal column. It coursed upward, splintered the left twelfth rib and entered the thoracic cavity on the left side. The fifth bullet entered the body at about the middle of the left ilium, which it pierced, passed upward, forward and to the right and was found beneath the skin near the right ninth costal cartilage. In its course it had perforated and badly lacerated the descending colon and passed along a fold of the stomach, tearing, a large hole in its lower anterior surface. The visceral wounds were repaired with silk sutures and drainage provided in all external wounds. X-ray examination failed to locate the bullet in the chest. This patient led a precarious existence for several days, but finally recovered and was discharged on the forty-first day.

Case 3. S. D., Italian, age 40, was shot twice in the back, July 15, 1911, and operated upon within four hours. The patient was unconscious when admitted but very restless, presenting the symptoms of internal hæmorrhage. He vomited a large quantity of undigested food mixed with blood and continued to vomit blood. On examination two bullet wounds were found. One bullet entered the body in the left axillary line at the lower border of the tenth rib, laid bare the rib and continuing its course perforated the stomach on its posterior surface near the cardiac orifice and emerging therefrom farther down on the anterior wall came to rest beneath the skin two inches below and to the right of the ensiform appendix. Upon opening the epigastrium blood gushed out. The bleeding was traced first to the anterior wound in the stomach. This was temporarily closed with forceps and a hunt made for the other perforation. After diligent and somewhat prolonged search the posterior gastric wound was found, as already indicated. The perforations were closed first with silk and then re-enforced with catgut. No other visceral wounds by that bullet were found. The other bullet entered the right side of the back about an inch above the crest of the ilium and

vertically beneath the angle of the scapula. The abdomen was opened again over the appendiceal region and the structures examined. No perforations were observed, nor was that bullet found. Thorough drainage, Fowler's position and saline by the drop method were instituted as usual. The patient reacted well, established convalescence and was discharged on the twenty-fifth day.

CASE 4. T. C., Italian, age 29, was shot through the right lumbar region posteriorly at the same time as the preceding patient, July 15, 1911. Operation followed within six hours. The bullet was found in the abdominal wall in the same region anteriorly, having traversed coils of small intestine four times, making eight separate holes. The holes were not clean cut but jagged and large and the wounds of entrance and exit were in two instances so close as almost to make one opening. There was much blood free in the cavity and feces exuded through the wounds. The lacerated gut was laid on the operating sheet and douched and the openings closed with silk and catgut as usual. Fearing lest the lumen of the gut had been narrowed too much, I excluded all the wounded area by means of a McGraw elastic ligature, which connected sound portions of the intestine proximally and distally. Drainage was provided as usual. The patient did well at first but was surreptitiously given food by visitors, after which colicky pains and toxæmic symptoms developed. He died on the fourth day.

CASE 5. C. P., colored, age 24, had a tight stricture of the entire urethra and was on his way to obtain relief therefrom, July 29, 1911, when he was shot through the abdomen. Examination showed a bullet wound in the median line one and one half inches above the symphysis pubis. He was prepared for laparotomy within two hours after receiving the injury. The bullet wound was enlarged in the median line. The path of the bullet was traced outward to the left side and slightly upward and through the ilium. The bullet lay beneath the skin an inch and a half below the crest of the ilium and an inch posterior to the anterior superior spine. In its course it had made four jagged openings in the small intestine, within an area little more than 2 inches long, allowing the contents to run out. No other holes were found, but the gut looked bruised at several points. The bowel was sutured to the peritoneal opening to form a fistula and drainage placed alongside. The patient recovered from the injury rapidly and the fistula closed spontaneously. He was taken to the operating room again August 19th and the urethral stricture cut internally to admit a number 33 French sound. He bled profusely through the urethra but recovered perfectly and left the hospital September 1, 1911.

CASE 6. Mrs. D. L., Italian, age 26, was brought to operation, August 3, 1911, an hour and a half after having been shot in the left lumbar region. The wound was one inch posterior and superior to the anterior superior spinous process. It was enlarged and carefully explored and the track of the missile traced to the brim of the pelvis, from which point it was believed to have glanced outwardly. The wound was drained and closed. An X-ray examination later failed to locate the bullet. Recovery ensued and the patient left the hospital on the tenth day.

CASE 7. Mrs. J. S., age 34, was shot twice on September 19, 1911. She was operated upon about eleven hours afterward. One bullet entered the back of the neck near the median line over the third cervical vertebra, glanced forward and to the left and lodged in the cheek an inch external to the left ala of the nose. In its course it shattered the left ramus of the inferior maxilla. She spat blood freely. The second bullet entered the tenth interspace midway between the spine and the right axillary line, passed forward and upward through the head of the pancreas and the left lobe of the liver one half inch from its anterior border and was arrested in the subcutaneous structures of the midepigastrium half an inch to the left of the linea alba. On incising the abdominal wall above the umbilicus the track of the bullet was seen before its location was known. The wall was opened and blood welled out principally from the wounds in the pancreas. Catgut ligatures were applied, but oozing continued. No perforations of the hollow viscera were found. A large drainage tube was inserted, two inch bandage gauze packed around as a compress and the wound otherwise closed. The posterior wound was enlarged for examination and also drained. The patient was propped in the Fowler position, given saline by the drop method and has made a steady recovery. To-day, the twentieth since the injury, she is on a full diet and able to be out of bed.

CORRESPONDENCE

DEAR DR. MARTIN: I am enclosing a communication for your magazine in regard to Dr. Kanavel's book, "Infections of the Hand."

This work by Dr. Kanavel is to a very large extent the result of his own studies of the hand and the inflammations affecting it. It is a work produced on the basis of the best methods of German and English original monographic studies. Without confining himself rigidly to his own investigations, he has entered the field of diseases of the hand and has made contributions to their study which are of permanent value. At the outset of his work upon this topic, the undersigned was skeptical as to the possibility of finding large uninvestigated fields of study in connection with these infections, and was agreeably surprised to learn that Dr. Kanavel could get no information as to studies of the various spaces in the hand of surgical import. The field therefore was relatively free for original investigations, and Dr. Kanavel thereupon entered enthusiastically upon the work. The study is original, and even the questions were propounded by Dr. Kanavel himself. His method of attack is at once anatomical and pathological, though the former is predominant. The possibility of practically applying the results of these investigations of the different spaces in the hand in practice, Dr. Kanavel has abundantly demonstrated, and this fact makes his theoretical observations of all the greater importance.

In fact, the surgeon will be obliged to consult this work if he wishes to have a clear conception of the inflammations affecting the upper extremity.

American surgeons may well congratulate themselves upon having had so careful and painstaking a study of a surgical topic made in their midst.

WELLER VAN HOOK.

Chicago, March 20, 1912.

TRANSACTIONS OF SOCIETIES

COMBINED MEETING OF THE PHILADELPHIA ACADEMY OF SURGERY AND THE CLINICAL CONGRESS OF SURGEONS OF NORTH AMERICA

PHILADELPHIA, NOVEMBER 13, 1911. DR. ROBERT G. LECONTE IN THE CHAIR

DR. CHARLES H. MAYO, of Rochester, Minnesota, read a paper entitled, "Some Observations on the Thyroid Gland and Its Diseases." (See page 363.)

DISCUSSION

DR. FRANCIS J. SHEPHERD, of Montreal: I have seen many cases of thyroid goiter, but I do not, like Dr. Mayo, work in the thousands. He spoke of the parathyroids as though he had a great deal of respect for them, which I must confess I have not. The parathyroids are not so easy to find, even in the dissecting-room, and are much harder to isolate in operating. I have taken out several parathyroids which I have turned over to the pathologist for examination only to have him report that they were nothing but lymphatic glands. Of course, we all know that they do exist, but I do not feel so alarmed at removing them as some other operators do.

Ordinary goiter may be epidemic, endemic, or sporadic. The fact that goiter occurs more frequently in some regions than others is an admitted fact. In parts of Europe where cretinism is most common the disease is endemic. In Canada I know of several districts where it is endemic, such as the Calumet, Three Rivers district, etc., where not only human beings are affected but also animals. Drinking water is, according to common opinion, a fertile cause, so much so that certain springs in Germany are called Kropf-brunnen, and are resorted to by many men who wish to avoid military service. No doubt a specific organism is the cause, but this organism has not yet been found. The disease is usually acquired, but I have seen several cases of congenital goiter, in one case so large that it interfered with delivery at birth. In most of these congenital cases the disease disappears in a few weeks. In the case just mentioned the mother as well as the child had a goiter.

Now, as to the different forms of goiter: First, we often see in girls at puberty and in pregnant women a uniform enlargement of the gland, soft, non-vascular, and not nodular. These glands in young girls disappear usually in a few months, and I think both thyroid extract and the iodides are administered with benefit.

Second, the adenomatous, simple or fœtal. The simple are the most common and they are structurally merely an enlargement of the normal thyroid; the vesicles filled with colloid are larger than normal and lined with flattened epithelium. The adenoma may be confined to one-half of the gland, usually the right, and may be encapsulated, and may be single or multiple. The fœtal form is in structure that of a fœtal thyroid. Columnar cells fill up the vesicles in which there is little colloid.

Third, the cystico-colloid may be regarded as a degeneration of the adenomatous. Vesicles develop into large cysts filled with colloid. The adenomatous and cystic goiters are the most common forms we see in ordinary surgical practice, and they often are of many years' growth. The patient seeks for relief chiefly on account of pressure symptoms. The pressure often causes paralysis of nerves, especially the inferior laryngeal. These may be completely paralyzed on one side or the other. I have found this paralysis to occur on the left side even when the large growth was on the right, and I do not know exactly how to account for that. Pressure on the sympathetic may produce dilatation of the pupil of that side. The trachea may be flattened out like a ribbon or squeezed laterally so as to become knife-shaped, and give rise to symptoms of difficult breathing, with paroxysms of dyspnœa; or, in certain cases, again, the trachea may be pushed to one side. Pressure may result in the softening of the trachea, and sudden death occur from kinking of this diseased structure. Paralysis of the abductor

muscles is a dangerous complication; in this condition, although expiration is quiet, there is great difficulty in inspiration. Difficulty in swallowing in certain cases may occur. I have occasionally seen this symptom due to a growth between the trachea and esophagus. Disturbance of the circulatory system is often present in old goiters. There may be pressure on the jugular vein, followed by dilatation of the right heart, and then may follow œdema of the mouth and even the upper extremity. Of course, attacks of palpitation are common and fainting fits may ensue and cause sudden death. Hæmorrhage into cysts may occur from severe seasickness or vomiting attacks.

The fourth form are the hyperplastic goiters, such as are found in true Graves' disease. There is a great development of cylindrical epithelium and usually an infolding and budding of the lining of the vesicles, and the smaller amount of fluid in these vesicles, according to Kocher, is not colloid but only a clear fluid. The gland is very vascular and there is great capillary hyperemia. The so-called vascular goiter is really an early stage of Graves' disease. There is hypertrophy of all the blood-vessels, the whole gland is swollen, and there is distinct pulsation, and a systolic bruit.

Fifth group: The tumors, benign and malignant. The benign are rare if we except adenomata, but fibromata and lipomata have been found.

The malignant tumors may be divided into sarcomata and carcinomata. The latter are the more common; according to Chiari, in 7,700 postmortems there were 11 carcinomatas and 5 sarcomatas of the thyroid. But Linacher of Berne found in 7,461 autopsies 44 carcinomatas and 38 sarcomatas. Sarcoma forms more rapidly and metastases occur very early in half the cases. The special form of cancer of the thyroid is the adeno- or alveolar carcinoma; the epitheliomata are rare. In cases of rapidly growing goiter excision should be advised. Bloodgood advises removal of all asymmetrical growths in women over 30. In cases of sudden enlargement due to hæmorrhage into a previously existing cyst, I have in several cases proved them to be due to cancer. Pain and difficulty in swallowing are symptoms which should put us on our guard as to the probable existence of cancer. Metastases frequently occur and these in many cases have the histological appearance of true thyroid tissue. Early operation is the only hope, for, once the tissues beyond the capsule become infiltrated, the case is usually hopeless.

Sixth group: The other affections of the thyroid are the acute inflammations and the infective inflammations, as tuberculosis, syphilis, actinomycosis, and echinococcus disease.

Probably the most interesting affection of the thyroid is that which exists in the so-called Graves' disease, which results in hyperthyroidism. Many incipient cases exist which are not recognized and many cases develop in already existing enlarged thyroids. These cases are usually the safest for operation. Again, in many thyroids which I have removed, and which have been carefully examined histologically, there have been found areas of hyperplasia such as exist in true cases of Graves' disease and yet giving rise to no symptoms of hyperthyroidism. Possibly had this condition increased Graves' disease would have developed in these cases. But infolding of epithelium may occur in any gland in which active hypertrophy is going on, and this is well seen in the prostate. Again, glands have been carefully examined throughout and yet no hyperplasia has been found, but much colloid and an increase of connective tissue. In the cases where hyperplasia is found with excessive colloid degeneration, it has been suggested that the colloid neutralizes the excessive secretion of the hyperplastic thyroid tissue. In all the fatal cases of Graves' disease I have seen there was also a great enlargement of the thymus gland, and in one case hypertrophy of both adrenals. The concomitant enlargement of the thymus has never been satisfactorily explained.

The exact relation of the parathyroids to the thryoid is a matter much in doubt. Vincent and Joly state that where the parathyroids have been extirpated in animals they do not die. Gley and MacCallum assert the contrary. Forsythe, a comparatively recent observer, holds that the parathyroids are really thyroidal in nature, have no special function, and are really not essential to life. Others hold that where the thyroid is extirpated the parathyroids assume its functions and develop colloid vesicles. I have extirpated completely over a dozen thyroids, and have taken no care to preserve the parathyroids, yet I have never seen a case of tetany or other bad result following, except a case of malignant disease where myxœdema developed.

With regard to the anæsthesia in these cases of hyperthyroidism, I have always given a general anæsthetic, ether or ether and chloroform by the drop method. I have used a local anæsthetic in some few cases, but I do not like it and the patients seem to like the general anæsthetic better also.

The mortality in this disease is due to operations on cases which are utterly unsuitable. The physician keeps the case until it is practically *in extremis*, and death is usually the result of operation at this stage. I am now very careful in selecting my operative cases, waiting and treating the case by rest, X-ray, ice-bags, always when possible trying the palliative treatment before the radical. I have quite a number of cases in which open air, rest, etc., have been attended with very good results, although these were considered hopeless cases.

Whoever undertakes to perform an operation on the thyroids should be perfectly sure of his anatomy. The important thing is to prevent hæmorrhage, and this you can do if you know where the hæmorrhage is coming from. Also it is important to avoid injury of the inferior laryngeal nerve, the situation of which one should be very careful to know.

Dr. A. J. Ochsner, of Chicago: I will speak but a few words upon one of the practical phases of the treatment of thyroid goiter, to which Dr. Mayo referred in his illustrative slides. There is a condition which we may call a margin of safety in these cases. Many of these cases have a margin of safety so that you can treat them in almost any way, with almost any skill or lack of skill, and they will recover. But there are other cases which have suffered from hyperthyroidism for a considerable period of time, so that the effect of this hyperthyroidism upon the heart, blood-vessels, and nervous system is so extensive that their margin of safety has been decreased to a great extent. There is still another class of cases in which this hyperthyroidism has existed for a shorter period of time, but in which there is an acute, very severe exacerbation of this hyperthyroidism, which vastly decreased their margin of safety. Take the two classes of cases in which the margin of safety has been decreased from one cause or the other, and it is here that your surgical judgment must come into play, because in these cases the surgeon with good surgical judgment will save the life of his patient, while the surgeon without good judgment runs a great risk of losing it. In cases in which the hyperthyroidism has existed for a long period of time the operation which Dr. Mayo has illustrated, consisting in ligating the blood-vessels, is to be performed, because it requires but a very slight margin of safety for the recovery of the patient. In the class of acute exacerbations the margin of safety is not permanent; in most all of these cases if you take a careful history you will find the same thing has repeatedly occurred before and that each time with rest and absence of physical, mental and emotional irritation the hyperthyroidism subsided until the patient seemed almost well. What has happened once will happen again, and you will then have an increased margin of safety, at which time it would be best to remove the cause of the hyperthyroidism and allow a permanent recovery of your patient.

One thing which came up in Dr. Shepherd's discussion I should like to speak about, namely, regarding the histological picture in hyperthyroidism in exophthalmic goiter. For several years, ever since Dr. Wilson came out with his first paper on this subject and since he showed me his first demonstrations under the microscope, I have tested the accuracy of this by examining each specimen without knowing from what patient it comes. Once every week I examine personally every section that is made in our laboratory in order to confirm or criticize the opinion of the man who does the microscopy, and I have found that practically in every case I am able to tell not only whether it is a case of hyperthyroidism, of exophthalmic goiter, or an ordinary goiter, but whether it is severe or mild in character. I am sure Dr. Wilson's ideas on this subject are entirely right.

Dr. Charles H. Mayo, of Rochester, Minnesota (in closing): Dr. Shepherd is quite right in the rarity of injury to the parathyroids producing serious consequences. During the past summer I saw my first case. It always seems quite serious, however, when you do see such a case, for you are apt to feel that it is due to your faulty technique.

On the left side of the neck the left recurrent laryngeal nerve is deeper than on the right side; it is closer to the trachea; the right side is usually larger than the left and there are more operations made upon it. Tumor of the right lobe is just as apt to produce paralysis of the left side from pushing the trachea over and pinching the left recurrent laryngeal nerve, as though this nerve were directly affected from tumor of the left lobe.

With regard to the causes of death in these cases, I am sorry we did not have some medical discussion on this point. Some people say they never see these patients die. This year two cases died within one hundred miles of Rochester on the train. Another died three hundred and fifty miles away on the train. That means these patients were in extreme condition when sent to the surgeon. I had four cases die in the city in a hotel, three in 24 hours after arrival and one

after four days. Operations for thyroid goiter are not life-saving procedures, as Dr. Ochsner has pointed out, for these cases have all the fluctuations of a chronic disease, and better surgical and medical judgment should be made in the selection of cases for operation. Acute hyperthyroidism is like a discharge of electricity. Ligating under cocaine the left upper lobe will produce three quarters the disturbance as would be caused by ligating both, but that remaining one quarter is the margin of safety. If there is a highly marked reaction in five or six days you can under cocaine ligate the other pole on the same side. Supposing your judgment was not right, that this patient did not react after ligation of the left upper pole, the next week you operate and take out the right lobe, thus equalizing the shock.

The medical cases, those with extreme vomiting during pregnancy, should be fed thyroid extract every four or five hours, ten grains to the dose. This is better treatment than anything known to-day. In these cases as soon as the stomach has recovered so that it will receive food without vomiting operation under cocaine should be done at once, ligating the vessels, and at the end of four months there will be an average increase of weight in the patients of 22 pounds.

With regard to the failure to cure. We operate on a case coming in with gunshot wound of the abdomen, stomach or liver. What good does it do when the patient has brown atrophy, nephritis, atrophy of the liver? You can get out the bullet from the neck but you have not cured the degeneration of the organs of the body. The same thing is true in hyperthyroidism. By operation you check toxæmia, but the medical man who has taken care of the patient for two or three years does not consider it a cure. He has not the slightest conception of the disease. If a patient relapses under medical treatment, the thing to do is to give them more medicine; but if they relapse after surgical interference the case is a surgical failure.

Dr. Joseph A. Blake, of New York, read a paper entitled, "The Operative Treatment of Fractures." (See page 338.)

DISCUSSION

Dr. Edward Martin: Since the fundamental principle on which the open treatment of fracture is based is the securing of broken bone ends in accurate apposition one with the other, and their retention in this position, it is obvious that operation is indicated only when this end may be attained by no simpler method of reduction. It is true that absolutely accurate and complete reduction, though always desirable, is in the vast majority of cases not obtainable by manipulative procedures, nor is it essential to satisfactory cosmetic results or complete restoration of function.

As each fracture patient presents himself, the question as to whether his interests are best guarded by conservative treatment or operation must be answered by the individual surgeon on the basis of his clinical experience and knowledge of recorded cases. In certain instances, as for instance compound fractures where reduction and retention are both difficult, fractures with interposition of soft parts, fractures with such displacement as to make union uncertain, deformity assured and function imperfect, the need for operation is obvious. In other instances where satisfactory reduction is obtainable by manipulation with or without anæsthesia and this reduction can be maintained by splints and bandages operation will be suggested only by a limited number of enthusiasts who regard a cure without cutting as a reproach to the surgical profession. There are borderland cases in which even the most experienced may hesitate as to the choice of treatment.

The tendency of the day, and one justified by results, is toward open treatment of these borderline cases. Among them, however, should be classed with very great conservatism all fractures of children, meaning by this term those whose bones are still actively growing. Two factors obtaining at this age justify such conservatism. First, the speed and efficiency of the reparative effort. Next a remodeling process having for its effect the correction of even a gross deformity. As an illustration, this series of X-ray pictures is shown. The fracture is nearly transverse and at about the mid portion of the femoral shaft. Four efforts were made at reduction, ether anæsthesia first and nitrous oxide subsequently, as we hesitated to repeat even ether at short intervals. These efforts were unavailing. The X-ray shows not only overlapping but a distinct space between the bone ends, presumably filled by blood clot and inflammatory exudate. The patient, a boy of eleven, was dressed with a plaster cast and extention, the mother having refused to allow operation. The course of callus formation and the gradual correction is beautifully shown in these pictures. He has now no deformity nor interference with function. Even had it and his fracture united with an angular deformity this also would have exhibited a tendency toward correction rather

than increment. The second series shows the result in another case, two years after union, with considerable deformity. In the adult, and particularly in the middle aged, there is little modeling tendency and an angularity once imposed will probably increase.

Operation having been decided upon, the time that it should be performed is the matter of next consideration. It is easiest immediately after infliction of the injury, when the efforts at reduction made under etherization show that this cannot be satisfactorily accomplished. It is not quite as easy five days later, though then reaction has reached its height and resistance to infection is increased. It becomes progressively more difficult with the lapse of time until in the course of months it becomes at best an operation involving much trauma to the bone and its vascular connections.

The incision should therefore be made promptly, since if children be excepted a reduction not accomplished by the first effort is not likely to be attained subsequently. If the procedure be carried out on even the fifth day, this delay does not materially after-increase the difficulty. When weeks or months have elapsed and the fracture is not united or vicious union has occurred the problem of apposition usually implies a stretching of soft parts, impossible of accomplishment, excepting by direct pull upon the bone. This is best done by means of a canvas loop passed over the proximal end of the distal fragment, to which are attached weights, or better still, to an entirely satisfactory apparatus, designed by Dr. Eliason, which accurately registers the amount of pull, which is regulated by the easy turning of a handle. A caution to be observed in the use of this pull, which should be applied for not over five to ten minutes, is to the effect that it is productive of shock and that the moment the pull begins to go up or the blood pressure to fall, trachea should cease and the operation should be rapidly concluded by resecting the ends of the bone, apposing them and applying the plate.

The ends of the bone having been brought in proper apposition one with the other, the question how they are to be thus retained must be decided. The answer to this should be in the simplest manner with the least trauma to the periosteum and with the least possible amount of foreign matter left in the wound. Therefore sutures of either chromic gut or kangaroo tendon are preferable to wires, staples, screws, nails or plates, and are at times more applicable than the latter, as in cases of fracture of the patella or of the olecranon, of the tearing away of the tuberosity or trochanter or of tendinous attachment.

Under some circumstances plates are obviously the means of retention to be selected. As, for instance, in fractures of the long bones of the upper and lower extremities. In the femur the bone is so deeply placed and so subject to cross and twisting strains that the plate must be of great strength, since the external fixation apparatus cannot be so applied as to be entirely adequate. The plates usually supplied, known as the Lane plates, have many times broken, nearly always at the position of the screw eye. In their latest development, to prevent this they have been made thick and clumsy, hence objectionable because the likelihood of trouble arising from foreign body in the tissues is directly proportionate to its size. This difficulty is overcome by the use of vanadium plates which are three times the strength of the ordinary steel plates and bend in place of breaking. These plates can be depended upon absolutely to stand any strain to which they may be reasonably expected to be subject, and moreover it has been shown that two screws in either end driven through one thickness of the cortex are entirely adequate to hold these plates in position. It might seem with these strong plates that when properly applied the patient could be allowed to convalesce without external support. Such is not the case. After plating accurate external splinting is quite as important as it is in fractures treated conservatively. This because living tissue will not hold against the constant working of the screws incident to slight motions of the part. In a few days if the limb be unsupported, the screws inevitably become loose, this in the absence of infection, and the plate no longer holds. The splinting which most accurately retains is that of plaster of Paris laid on over a layer of cotton batting applied in the form of wide bandages. While still soft the plaster is cut in such way as to allow of inspection and manipulation of the extremity operated upon.

In heavy people with broken thighs this plaster encasement is difficult of application. The slings dressed by Eliason make the application of the plaster dressing easy. Such dressing for the femur should fix both the knee and the hip and should have incorporated in it metal bands previously bent to form.

As to the results of the open treatment of fracture, they are usually good. Union is usually delayed and its delay is somewhat proportionate to the difficulty of the operation. An early,

swift, non-traumatizing procedure is followed by union in somewhat slower time than could be expected with a fracture properly apposed treated without operation. The old cases which have been handled and stripped heal very much more slowly. In some of them there is a slow secondary infection developing days, weeks, months or years after the operation, in the latter case incident to trauma and requiring removal of the plates. In compound fractures the plates usually require removal in from two to four weeks, the screws ceasing to hold in this time and the plate simply acting as an irritating foreign body. In some cases the plates remain entirely quiescent. That they will so continue to do, though probable, remains yet to be proven.

Dr. John B. Walker, of New York: I have known 30 cases, 17 of the femur, in which I have used Lane's plates entirely, and in no case did the plate come out. In one case of double fracture of radius and ulna I applied a plate, not with a very large incision, not as carefully as Mr. Lane; the parts were bruised, and later on a mild suppuration occurred and the plate came out. Two years ago, in 1909, Mr. Lane read a paper on the operative treatment of fractures, and at that time there were very few articles on this subject; to-day, in going over the literature there are twenty-five times as many articles as there were then. Surgeons throughout the country are being forced to take up this operative treatment, largely due to the fact that a number of accidents among laborers are being covered by indemnity insurance, and the employers demand a high grade of treatment of fractures. In all cases I have operated on, I have first prepared the skin with iodine and then with extreme care kept out of the wound, using very long instruments. The success of this operation must depend largely upon special instruments and even more careful and painstaking technique than is used in the abdomen.

With regard to clamps, I have found Lambotte's to be better than the Lane clamp, but lately have used, with much satisfaction, the clamp introduced by Dr. Lowman.

At first, in these operations, the muscles and fascia were united with catgut in their several planes, but in a number of cases in the last year no sutures were used at all. After operation the tissues and soft parts are brought together and the skin united with interrupted silk sutures.

Dr. Joseph A. Blake, of New York (in closing): I would take exception to Dr. Martin's remark that the plates were to stand intermittent strains, not steady ones. They are to take a strain during dressing or passive motion; if a steady strain, then absorption occurs.

I agree with him about the necessity for improvement in the Lane plate. I have seen a couple of plates break, one while Mr. Lane was putting it on. One of the student assistants lifted the extremity up by the foot and the plate broke in two, after Mr. Lane had just told me that it would hold 400 pounds! That, of course, was not Mr. Lane's fault, but rather the fault of the machinist who struck out a number of these plates without testing them. Another plate broke at the Presbyterian Hospital, but through a mistake I missed getting a radiograph of it. It was in a compound fracture which Dr. MacWilliams was treating, and it broke at one of the dressings. An involuntary contraction of the muscles of the thigh caused by their hurting the patient, snapped the plate in the middle through the screw. They often break at the screw holes, and if you look over a plate carefully you will find the holes are not always bored through and not countersunk right, being rather off at the side. Just test a plate in a vise before putting it on the patient; this will not weaken the plate unless it breaks it.

Dr. J. M. T. Finney, of Baltimore, read a paper entitled, "The Significance of Blood in the Stools, with a Report of Some Interesting Cases." (See page 321.)

DISCUSSION

Dr. Arpad G. Gerster, of New York: The interesting part of the paper read by Dr. Finney is this, that the first time in my experience I see a laboratory man stand on his defensive, inasmuch as he used the phrase, "the despised laboratory man." Not long ago it was the practical man who was looked down upon and the laboratory was looked up to as a fetish that would teach everything. To-day I see that the laboratory begins to stand on the defensive. I bring this out merely as an interesting phenomenon, that everybody who looks at things rising to a certain distance away from things which go on can observe without any direct personal interest in the matter. As far as I am concerned, I have always taught and teach to-day that there is no possibility of practising medicine and surgery without a thorough scentific foundation, and that such foundation cannot be anything else than sound diagnosis. You must have facts upon which to base your diagnosis. You must be told facts that will stand up before any criticism. The laboratory has added to the fund of our facts an enormous number, and we should

be grateful to the laboratory. But the facts of the laboratory put at our disposal if taken at random, if their value is not weighed in each case and judged in proportion by common sense, will mislead us as we all know and the finer these methods become the more misleading and the more delicate the tests.

A large quantity of blood evacuated from the intestinal canal will be recognized by everyone, and its significance will not be held in doubt for a moment. But the occult quantities are the ones which must be considered with a great deal of critical sense, because often too much weight is laid upon them. It has been stated to-day that the scientific method which is pursued by instruments of precision is an important one. I say Amen to this statement, but the practical man (I have been raised in the laboratory) deserves some credit. I will illustrate this.

A practical man without any very sound scientific foundations invented an accurate, thorough and antiseptic method. This was the result of empirical observation, and upon it was based the circumstances that we can to-day undertake operations in the abdominal cavity especially which previously were considered to be *noli me tangere*. A great many more operations than were necessary were performed, but this had the tremendous advantage that we were able to make an autopsy in vivo. The whole history of appendicitis shows the truth of my statement. On this fact, which is to be attributed to the daring of the practical man, depended the circumstances by which we come to recognize the insufficiency of our diagnostic methods, and these facts stimulated the investigators of surgery to find the reasons of certain uncomprehended phenomena. If antisepsis had not been devised and developed as it has been the wonderful experiments of Pawlow, who has thrown much light on the biochemical affections and motor affections of the stomach, because in olden times most of the dogs experimented on died, would have been lost to science.

Let us be just. The practical man has done much good indeed and we are indebted to him for things which have advanced surgery and medicine in general.

PEDIATRIC SOCIETY OF PHILADELPHIA AND CLINICAL CONGRESS OF SURGEONS OF NORTH AMERICA

IN MITCHELL HALL, COLLEGE OF PHYSICIANS OF PHILADELPHIA, TUESDAY, NOVEMBER 14, 1911.
DR. J. TORRANCE RUGH, PRESIDENT OF THE PEDIATRIC SOCIETY, IN THE CHAIR

DR. CHARLES L. SCUDDER, of Boston, read a paper on "Congenital Stenosis of the Pylorus." (See page 374.)

DISCUSSION

DR. EDWARD B. HODGE: Dr. Scudder's previous paper, to which he has alluded, appeared in SURGERY, GYNECOLOGY AND OBSTETRICS September, 1910. This paper made a deep impression upon me. Any one who read the paper, I think, will agree with me that he showed very clearly the truth of two points brought out tonight, namely, that the disease can be successfully treated by means of surgery, and that these successfully treated patients live to grow up and become healthy children. The stomata are still open and the pylorus still closed. We must bear clearly in mind what Dr. Scudder emphasized, that he was talking about the organic tumor cases. There are many instances in which there is no tumor but in which three are very grave symptoms due to so-called pyloric spasm. There are border line cases in which there may be a tumor which is not palpable. I think we are sometimes in danger of operating upon patients who have no tumor and who can be successfully treated medically. There are many such cases restored to perfect health. I wish to advocate the calling in of the surgeon early to see the patient with the physician, that the case may be studied together and time thus saved if operation is later required. An important point is the very largely decreased mortality of the operation. Up to a few years ago statistics gave a mortality of between forty and fifty per cent. The percentage in the series of recent operations quoted by Dr. Scudder is under ten, and this in the hands of a number of different surgeons. So the operation is not only satisfactory, but is relatively safe. Personally I would make a plea for the early co-operation of the surgeon and physician in the examination and treatment of these cases. I

think it would be interesting if Dr. Scudder will give us, in closing, some points of the technique of the operation.

DR. HARRY LOWENBURG: The members of the Pediatric Society may remember that some months ago I presented before the society a paper reporting a case of pyloric stenosis in an infant operated upon by Dr. Stewart. The baby's weight was 5 pounds and 7 ounces and its age 6½ weeks. The last record I have of the case was made 10 months later, when it weighed 17½ pounds. The child is now in Brooklyn. I saw it in Atlantic City some two months ago. It is nearly two years of age and is normal in every respect.

My own experience with pyloric stenosis comprises five cases. The first case I did not recognize, and the patient died. The second case was the one I reported before this society upon which operation, posterior gastroenterostomy, was done and it got better. Shortly after that the Pediatric Society held a symposium upon pyloric stenosis, and the opinion at that time expressed by the majority was that we should wait before operating. About three days after that symposium I saw my third case. I was influenced by the opinion of that symposium and treated it dietetically and by lavage, and the patient died. The fourth case I saw this summer in Atlantic City, in which I made a diagnosis of pyloric spasm in a fairly well-nourished child. There were present the peristaltic waves and a palpable tumor, but constipation was not absolute. I advised dietetic supervision for a week, and if the case did not improve, a consultation with a surgeon with a view to operating. I saw no more of that patient. This evening I called the mother up on the phone, and she informed me that while the infant still vomited it had gained in weight and was apparently well otherwise. The fifth case, which I saw a week ago, was referred by a physician in Wilmington. The case seemed to be one of pyloric spasm, because there was no absolute constipation. It seems to me that the treatment depends entirely upon the diagnosis, and that hangs upon the presence of certain distinguishing symptoms. One of the most important indications for operation is absolute constipation. I regard this of greater importance than palpable tumor and peristaltic waves. We usually get the history in these cases that the child has never passed curds. The parents will tell you that with the idea of preventing operation, their view being that digestion, aside from the vomiting, is normal. In fact, many of these cases are not brought to the physician on account of the vomiting, which is often regarded lightly on account of its frequent occurrence, but on account of the extreme emaciation. The bowel movement in cases which require operation is nothing more than bile stained mucus upon the diaper. There is no fecal matter. In examining these cases I feel that we can do better if we give the child a few drops of chloroform. In all these cases of suspected pyloric stenosis, in which there is a history of vomiting, I routinely employ three or four drops of chloroform held about two inches from the infant's face. This is sufficient to just still its movements and it relaxes its belly sufficiently to permit of thorough palpation. There are two elements of mistake which ought to be emphasized. One is the presence of an enlarged gland, situated to the right and above the umbilicus, but lower down than the pyloric region. This gland may be mistaken for a thickened pylorus. Another possible source of error is the liability to palpate the hard edge of the rectus muscle and mistake it for the pylorus. Both these errors can be avoided by using chloroform and remembering that the pyloric tumor is movable and that the gland is not. I think that the association of a pyloric tumor and absolute constipation is the *sine qua non* for advising operation.

DR. ROLAND HILL, St. Louis: As one highly interested in this work, I hope that Dr. Scudder will give us some points in the technique of the operation. In my work at the Bethesda Foundling Hospital of St. Louis, I have seen quite a number of these cases treated by medical men, and only recently have operative measures been adopted. In looking up the subject I found five postmortem specimens of gastric stenosis, showing that medical treatment has not always been successful. The physicians of the West have been reading Dr. Scudder's papers, and six weeks ago the first case was turned over to me for operation. The patient was a baby five weeks old, turned over at 11 o'clock at night, and very sick. A posterior gastroenterostomy was done. It recovered and left the hospital in a week's time. It did not gain the first week, but gained one pound the second week, and has since done well. I believe that this field of surgery offers promise of great development in the future.

DR. SCUDDER (closing): I am glad to be able to answer the inquiries regarding technique. These babies, of course, are very weak as a rule, and most of them are in poor condition. It seems to me that there is very little one can do before operation for these babies to improve their resisting powers, other than keeping them thoroughly warm. A little baby loses heat faster in propor-

tion to its size of surface than an adult, and it feels the loss of heat. That may be an important element of shock in these cases. Consequently the babies should be placed on a warm water bottle, and the arms and chest wrapped in sheet wadding held on by light bandages. There should be a skilled anæsthetist. You can easily kill one of these little babies by giving it too much ether. By having the baby carefully, but thoroughly relaxed, just before operation you can keep it anæsthetized with very little ether. A little oxygen given at the time of the baby's getting blue overcomes any difficulty. The preparation of the operative field should be as simple as possible. Bathing with alcohol 70 per cent is all that is necessary ordinarily. The incision should be rather low. The liver is low and large in the baby, and consequently, the incision should be low and to the left of the umbilicus. The incision should be pretty good size, so that we may readily reach the jejunum and palpate the tumor. It is better not to take any of the organs out of the abdomen except the part to be operated upon. It is important to see that it is the jejunum close to the ligament of Treitz, and not some high loop of intestine, that is selected for the anastomosis.

I use delicate clamps. The stomach is sometimes large, and distended with gas and with food, is tense and the clamp cannot be easily applied. In those cases the passage of a catheter will sometimes overcome the difficulty, and even an incision without a clamp is not harmful, if protection with gauze and sponges is secured. The incisions made in the intestine and stomach are ordinarily about an inch in length.

As for sutures, for the first suture I use linen. For the inside stitch I use zero chromic catgut. The abdominal wound I have always closed with interrupted sutures since I once had a small hernia. Interrupted sutures are also used in the skin. This closure by layer takes but a moment or two longer and precludes the possibility of hernia. The omentum which is very delicate always persists in poking its nose out through the incision. I keep it in with some blunt instrument until the peritoneum is closed.

The after care of the patient is very important. The baby should be fed at first upon a weak mixture of whey,—a couple of drams every hour. This is increased gradually if vomiting does not occur. Modified milk is afterwards used. The child is fed by means of a medicine dropper and not nursed at first. The gain in weight begins rather quickly. The postoperative temperature is sometimes high. It is important for the physician to realize the simple proposition that little babies rapidly lose their resisting power if starved or underfed. Therefore, it behooves the physician to so carefully study his doubtful cases that there will be a margin of safety upon which the surgeon will be able to do his work successfully. It is unfair to the baby, it is unfair to the parent of the baby, it is unfair to the surgeon to *almost* starve the baby to death before having the case placed in surgical hands.

Dr. Charles N. Dowd, of New York City, read a paper on "Some Differences between the Surgery of Children and Adults." (See page 353.)

DISCUSSION

Dr. Henry R. Wharton: I am sure that Dr. Dowd's interesting paper on "Tubercular Cervical Adenitis, Empyema and Tubercular Peritonitis," which conditions are especially common in childhood, has been appreciated by the members of this society. I was surprised to hear Dr. Dowd state that he met with so few cases of tubercular lymph nodes of the neck in children under one year of age. I am sure I have seen quite a number of children under this age in whom tubercular lymph nodes were present, but I agree with Dr. Dowd that their occurrence is more frequent after this period.

The treatment by operation which Dr. Dowd advocates and practices is the one now generally accepted and the results following the free removal of the infected glands have proved most satisfactory. I formerly operated upon these cases, employing vertical incisions, but have recently adopted the transverse incision for exposure of the glands recommended by Dr. Dowd.

In speaking of empyema in children Dr. Dowd stated that the mortality in these cases had been high in spite of free drainage by excision of a portion of a rib and the introduction of a drainage tube. My personal experience with empyema in childhood leads me to the conclusion that empyema in this class of cases is usually followed by recovery if the operation for drainage is performed early. The majority of cases of empyema in childhood in whom I have operated have been due to pneumococcic infection. The serous membranes of children seem more susceptible to this variety of infection than those of adults, as evidenced by the number of cases of pleural, meningeal and peritoneal infection of this nature seen in childhood. I operate in empyema as soon as the presence of pus in the pleural cavity has been demonstrated. I remove a portion of a rib

except in the case of infants, where I usually only employ intercistal drainage, introduce several good size drainage tubes and never irrigate the pleural cavity, unless later some reason to do so develops. I use no special appliance to prevent the admission of air to the pleural cavity. During the subsequent treatment of the case I encourage expansion of the lung by the blowing bottles. The earlier the operation, the better the chances for complete expansion of the lung.

As regards tubercular peritonitis in childhood, I agree with Dr. Dowd as to the advisability of operation in these cases, especially if there is present abdominal effusion, as these are the cases in which a most satisfactory result is apt to occur. In operating upon such cases I am careful not to attempt to break up adhesions, as free manipulations with this object in view are apt to be followed by the development of a fecal fistule.

Dr. John H. Jopson: I want to express my gratitude to Dr. Dowd, because I feel that nearly everything I know of the subject of tuberculous adenitis I have learned from him. It is interesting to follow the evolution of the surgery of tuberculous glands. I remember very well that my first surgical chief stated that he never operated unless the glands were broken down. We have witnessed the evolution in twenty years from aspiration, iodoform injection, simple incision, curettment, etc., to the apparently perfected stage of operative technique in the removal of the entire group of glands involved.

The first query of the parents in these cases of adenitis in children is whether the condition is tuberculous, and it is our plain duty to say that it is. The mere mention of the word "tuberculous" is sufficient to alarm the parents, but if we explain to them that the condition is primary, or at least secondary only to the infection of the tonsil, and that after removal of the affected part, the child is little more susceptible to general infection than if there had been no infection, much of the difficulty is overcome. The studies of Dr. George B. Wood of this city have demonstrated the course of the infection. In five per cent of children he finds tuberculosis of the tonsils removed. He shows the reason why tuberculosis of the cervical glands is a disease to which a larger percentage of children are susceptible than to tuberculosis elsewhere. He has worked out by injecting coloring matter into the faucial and pharyngeal tonsil the course of the lymphatic drainage into the upper cervical glands. If the disease is eradicated a permanent cure is reasonably sure. The statistics of Dr. Dowd show that 75 per cent of these cases not treated by thorough operation develop tuberculosis elsewhere. Dr. Dowd has shown us pictures of cold abscesses. To my mind the reason that so many surgeons have a skeptical view of the value of operation is, that they are content to operate upon a cold abscess and leave the focus of infection in the gland. As Dr. Dowd has said, this operation is tedious and requires from a half hour to an hour. It is not an operation desired by the dramatic operator who loves the applause of the amphitheatre. There is no class of cases that I approach with so much confidence as these of cervical adenitis in children of the better class.

I do not recall a case of surgical empyema in children not preceded by a history of pneumonia. The worst cases are those in which we have to operate in the presence of pneumonia. I have felt that the risk would be less if we could tide these children over until the toxæmia of the pneumonia had subsided. I have operated upon a number of cases under one year of age. I have had two recoveries, Dr. Hodge has had one and I think Dr. Wharton has had more. I have not had much recourse to the severer plastic operations on the thorax in children, and it is the exception in my experience that children have to have the more extensive chest resections.

Tubercular peritonitis we divide into the dry and wet cases. The first cases that I encountered in children were all dry cases and in these fistula was a frequent complication if we did more than open the peritoneum. They all died. Recently I have been fortunate enough to encounter a small series of wet cases in which the abdominal cavity could be opened and fluid removed and the results have been more favorable. I have a case now under my care of a child with cirrhosis of the liver as a complication. Before operation there was a mass upon the right side which resembled the liver, the nature of which I could not tell. Upon opening the abdomen we found a huge liver, extensive peritoneal infiltration with free fluid, and an adherent and imbedded appendix which was not removed because it would have caused fistula. The case was operated upon a short time ago and is doing well. The wet cases give improvement and occasional cure. If there is recurrence I think we need not feel discouraged. A second or third operation may give satisfactory results.

Dr. Dowd (closing): I have been asked to speak of the after-treatment of these patients. First, in regard to empyema; one naturally hopes that the use of suction apparatus will aid in securing lung expansion. We have tried a good many different forms of such apparatus, but have

never found that the patients really did better than when simple drainage into the dressing was secured. The best time to secure lung expansion is at the time of the operation; the finger should be introduced into the chest, and the coagula removed. The anæsthesia should be very light and the ether should be entirely withdrawn so that the patient will cough on the table. This usually brings the lung down, and we have not found difficulty in maintaining it there. We have, however, used the various forms of blowing apparatus during convalescence, so that forced expiration will help to increase the lung expansion. We have not used irrigation, excepting in the presence of gangrene and other foul conditions. We have sometimes found the use of five per cent bismuth paste helpful.

As to the after-treatment of the neck cases — immediately after operation it is important to use drainage in larger proportion than in ordinary wounds. Such drains, however, may be very small, a few strands of silkworm gut, simply enough to prevent accumulation of serum in the deeper parts of the neck. As to the later treatment, we believe that it would be advisable to give these patients the advantage of good hygienic surroundings. A very large proportion of them, however, are tenement-house children and they cannot have such advantages, and it is astonishing how well they do without them; the number of recurrences have been very few. Similarly, we think it desirable that the tonsils should be removed, but in a large proportion of these cases they have not been removed, and the children have been astonishingly free from tonsilar and pharyngeal inflammation or from later neck infection from that source. The later results of this operation lead one to believe that the inflammation is localized in a comparatively small area of the neck.

Dr. R. Tunstall Taylor, of Baltimore, read a paper on "Stereo-Arthrolysis, an Experimental Study; a Preliminary Report." (See page 327.)

DISCUSSION

Dr. H. Augustus Wilson: The frequent occurrence of ankylosis after various operative procedures for mobilization directs attention to the selection of suitable cases as well as to a discussion of the methods and material selected.

A movable joint without muscular control is often less capable of function than an ankylosed joint, particularly where the knee or hip is involved. The inability to secure equilibrium, requires external support in the form of braces or even crutches. In the upper extremities there is less necessity for equilibrium, and therefore, a freely movable joint with imperfect muscular control will be more serviceable than a rigid joint in either flexion or extension. With fu muscular control a flail joint at the elbow is capable of very extensive usefulness.

The problem in any given case is therefore not alone to secure a movable joint but to be able to induce muscular control.

In long-standing cases of ankylosis the accompanying muscle atrophy from disuse is the most serious factor. In recent cases the recovery of muscular control is more easily obtained because the inactivity of the muscles has been of shorter duration.

In the rapidly increasing methods of surgical procedure for mobilization of ankylosed joints there is abundant evidence of the unsatisfactory results, and the method of operation is often unjustly criticised and the post-operative procedures are overlooked. The long time that is generally necessary to secure voluntary function often discourages the surgeon and the case is generally turned over to some layman to manipulate. It is very difficult to induce a patient to persist in the use of a joint when such action causes pain, and yet, it is an almost invariable rule that the re-establishment of function after ankylosis is a painful process. The adhesions resulting from the previous condition, as well as from the recent operation, whether articular or periarticular, yield slowly to efforts to bring about normal control.

The extent to which the articulation is removed varies greatly from the entire excision of the ends of one or both bones forming a joint to the removal of only the articulating surfaces of cartilage. The interposition of various materials to prevent the denuded joint surfaces from coming into contact depend more for their success upon the amount of bone, etc., removed than they do upon the character of interposing material used.

Gluck's ivory joints were employed after removal of the entire joints and the artificial joints were inserted to compensate for the loss of stability. If these ivory joints could be made free from the destruction of wear or capable of replacement of worn surfaces, the objections to their practical use would be removed. The choice between movable knee without muscular control and a bony ankylosis in extension is strongly in favor of the latter.

A bony ankylosis of the hip is often preferable to a freely movable joint lacking muscular control.

A flail elbow or shoulder with muscular control is, I believe, better than when ankylosed.

We should consider as inoperable all cases where true ankylosis of several years standing has made the recovery of voluntary control either impossible or extremely doubtful, and confine operative mobilization to cases of fibrous ankylosis of recent origin, and to that vast range of cases of progressive bone and joint affections that tend untimately to produce ankylosis.

Hypertrophic osteo-arthritis offers a very large field for progressive work in the line of operative mobilization. The superfluous bone that is deposited in and around such joints can be removed and the joint surfaces left smooth, and covered with suitable foreign material to prevent contact.

The arrest of the progress of the affection should go hand and hand with the production of capable function.

Fibrous rigidity following attacks of acute arthritis, whether from traumatic synovitis or from infectious arthritis, are among the most favorable cases for operative mobilization.

Ankylosis following tuberculous ostitis is not an attractive class because of the long time that must elapse between the original lesion and the resulting ankylosis, together with the general lack of repair and of quick recuperation.

My own experience induces me to believe that chromicized pig's bladder as recommended by W. S. Baer offers the best promises of success and has the least disadvantages. I think the successful employment of the pig's bladder depends upon the removal of sufficient amount of the joint surfaces to secure a more than usual latitude of motion. I do not think it is sufficient to merely remove the articular cartilages because allowance must be made for the insertion of the pig's bladder. Now that I know of the method of inserting wax in the manner suggested by Dr. Taylor, I will seek an opportunity of using it in a suitable case. Permanent success depends upon selecting patients with fibrous ankylosis; the avoidance of operations in joints that are seriously deformed or of long standing; the removal of enough joint to secure great freedom of motion; early institution of passive motion; early establishment of voluntary muscular control; the avoidance of fixation appliances that interfere with normal function.

Dr. G. G. Davis: This is one of the most interesting subjects in all bone and joint work. It is almost as interesting to the orthopedic surgeon as cancer is to the general surgeon. The attempt to produce a movable joint where one has previously been ankylosed has been made in various ways. In the first place, attempts were made by the introduction of foreign bodies. These foreign bodies, almost without exception, have been failures. Another method is that of removing a large amount of tissue. The same methods are not applicable to all joints. For instance, it has been known for years that if you want to get a movable elbow-joint, all you have to do is to take away enough bone. Ankylosis of the elbow treated by resection has given some pretty good joints after all. When it comes to other joints it is another question. It has been proved by Esmarch, and especially by Dr. Mears of this city, that in work upon the jaw the interposition of tissue taken from the side of the cheek has given satisfactory results. In the shoulder you will likewise get motion if you take away a sufficient amount of bone. In the hip-joint ankylosis is more apt to occur. If the disease here has progressed to the stage mentioned by Dr. Taylor, in which the muscles are so involved that they do not contract and draw the bone up, resection will likely give a loose joint. When it comes to the knee-joint, everybody fights shy. Two cases have been reported by Fergusson and Annandale in which after ordinary resection of the knee a serviceable, movable joint occurred. But scarcely any one has been able to produce a movable knee-joint intentionally. The knee-joint presents the difficulty that it has to be used for support. The upper joints hang, but the lower joints support. I have had good results with the elbow-joint by making a transverse section and turning in flaps. I was induced to treat the knee-joint by following out the usual procedure of resection as used in the elbow-joint. I lacked the courage to try this method until about the time that Murphy published his work. I thought that if one inch was enough to remove in the elbow, 2½ inches would be right in the knee-joint. So I took away 2½ inches of solid bone between the leg and the thigh. I got a movable joint but the patient had to wear an apparatus. Then I began to turn in the flaps and got one good result. I tried twice again and got only slight motion. I then tried Behr's method in the hip-joint, and got 50° motion. I returned to replacing flaps and have three knee cases. They can all make full extension and flexion to right angle. If Dr. Taylor can show us that the wax does not irritate, it seems to me that the problem is almost solved. The interposition of flaps is a difficult operation. The wax does not seem to act like a foreign body. I think Dr. Taylor's work is a distinct addition to our armamentarium.

Dr. J. Torrance Rugh: I have had no experience with this method. I must confess that the thought had occurred to me that such a

method might be used, but I am one of those individuals whose experience it is to have some one else doing the thing before I do it. Especially had the thought occurred to me of using bismuth paste. The case which suggested this was that of a patient with a discharging sinus which had been injected in a naval hospital three years previously. I opened a large abscess, and passing my finger in, felt something peculiar. I enlarged the opening and squeezed out eight ounces of bismuth paste. The thought occurred to me at the time that if the paste remained for such a length of time unabsorbed, why should it not be useful in cases similar to those reported by Dr. Taylor, but I have not used it. I want to congratulate Dr. Taylor upon the report of these cases and upon his method of treatment of this most troublesome class of cases. If a satisfactory method, as simple as this appears to be, can be introduced into surgery, relief will be brought to a very large class of cases which will be appreciated beyond almost anything else. I appreciate most fully the privilege of hearing Dr. Taylor's paper. Any man who is doing work in this class of cases will realize the importance of this communication to the surgical world.

DR. TAYLOR (closing): Dr. Wilson said something about a wobbly joint. Personally, even if I had to wear a light brace, I think a movable, slightly wobbly knee-joint would be preferable to one ankylosed. I would prefer to have a knee-joint that would bend and to have one slightly unstable than not to bend at all. If you leave the crucial and lateral ligaments and have a wax that sets readily, you will have a definite plate between the two bones and less likelihood of an unstable joint.

Dr. Wilson also asked whether it might not be better to leave the knees ankylosed. Lorenz also believes in ankylosis, and in criticising American traction methods to secure mobility in tubercular joints could not, however, answer the argument that two partially movable hip-joints were better than two ankylosed, forcing one to eat all of one's meals off the mantel, or a partially movable knee to one ankylosed in full extension, over which every one trips in a street car, theatre and such places. Many cases come to us for deformed position as well as ankylosis, and we can help them by producing at operation not only a straight limb but probably a movable joint.

Dr. Davis told us at first that *all that was necessary* to do in ankylosis of the elbow was to cut away an inch of bone to secure mobility; but I do not feel that extensive excisions at the knee would accomplish this, and would be ill-advised in children for fear of epiphyseal interference with growth.

I appreciate very much indeed what Drs. Davis, Wilson and Rugh have said, but I must beg off about "the problem being definitely and finally solved," as Dr. Davis expressed it, in all cases in all diseases. I hope, however, that it may prove to be so or lead to modifications of the method that will be helpful and of wide application. I feel that the osseous ankyloses offer more hope than the fibrous types of rheumatoid and gonorrhœal origin. It is best not to move the joints for three weeks after operation, although traction should be used at the end of the first week. The silver skin suture should be left in for three to four weeks, as the capsule has been desected away.

ABSTRACTS OF CURRENT LITERATURE

DEPARTMENT OF ORTHOPEDIC SURGERY

UNDER THE CHARGE OF

JOHN RIDLON, M. D.

JOHN L. PORTER, M. D. — A. STEINDLER, M. D.

E. W. RYERSON, M. D. — H. WINNETT ORR, M. D.

Osteomyelitis of the Long Bones. A Study of Ninety-four Cases from the Children's Hospital, Boston. JOHN HOMANS. *Annals of Surgery*, vol. lv, No. 3, March, 1912.

The author bases the material for this paper upon those cases treated at the Children's Hospital in Boston since 1904, and his study has largely been confirmatory of Nichols's work. His purpose has been to determine and illustrate the manner in which infection attacks different bones, the variations in the course and virulence of the disease, the value of the Röntgen ray in diagnosis and treatment, and, finally, the results of the treatment itself.

Homans found in going over a long series of cases that the first evidence of disease has appeared at one end or the other of the infected bone. In other words, the history has generally shown that it was not the thigh, leg, arm, or forearm which first became painful, swollen, and tender, but the hip, knee, ankle, shoulder, elbow, or wrist. In most of the instances in which the history has failed to give evidence upon this point, the Röntgen plates have supplied the lack by identifying the original focus of infection.

Variations in the course and severity of the disease are well illustrated in the author's series. In some instances a mild attack has never required operation, and the only evidence of its passage has been a slight alteration in the bone, as shown by the Röntgen ray. In others the onset has extended over months and the cure required a very minor operation. In such cases the diagnosis of rheumatism or tuberculosis often is made.

The author regards the X-ray as a very valuable aid in the diagnosis and treatment of osteomyelitis, but he observes that its use is subject to one very important limitation. It appears to be a fact that according to the greater or less rapid destruction of bone in any one case, the Röntgen plate may lag more or less behind in revealing the full amount of damage.

With regard to the results, the author summarizes them as follows: There were 94 cases in the series studied.

Seven died as an immediate effect of the disease.

Forty are alive and well and have a perfect functional result. Of these, three had multiple infections.

Nine are stated in the out-patient records to be healed and in good condition, but have not been seen since.

Eleven have healed wounds but some deformity, which in no case is disabling.

Seven have unhealed wounds.

Twenty have not been heard from since leaving the hospital.

CONCLUSIONS

1. Osteomyelitis of the long bones in children originates in the ends of the diaphyses — rarely as a periostitis.

2. It principally attacks the weight-bearing bones.

3. The early or primary operation demands the removal of bone for purposes of drainage only. The infected medulla should be fully uncovered without doing unnecessary damage to the periosteum or endosteum.

4. Considering the power of regeneration of periosteum plus endosteum, early complete resection of a shaft is not advisable; therefore total resection later should be reserved for cases of total necrosis.

5. The Röntgen ray cannot be depended on for diagnosis in the very early stages, but is invaluable in following the course of the disease.

GEORGE E. BEILBY.

Flatfoot. HENNEBERG AND KIRSCH. *Zeitschr. für orthop. Chir.*, 1911, 281

Examination of the feet of a great number of school children revealed as many as 17 per cent, between the ages of 7 and 14 years, with flat feet. According to the authors, rickets is not the only, though by far the most frequent, cause of flatfoot in children, in spite of the fact that only one-half of the children examined showed further signs of rachitis. The authors conclude that flatfoot in children originates as pes valgus rachiticus and that the pes valgus staticus is only the manifestation of the functional disturbance. Military statistics also tend to corroborate this point of view. In

the light of this consideration, namely, that the so-called static flatfoot is really a rachitic one dating back to early childhood, it is strongly advocated to direct attention to the prophylaxis, especially as to the wearing of proper shoes and of light insoles, before it has actually come to a breaking down of the arches. A. STEINDLER.

Tendon Suture. FRISCH. *Arch. für klin. Chir.*, xciv, 4, 1911.

O. Frisch reports on the comparative value of different methods of tendon suture, considering foremost Dreyer's and Lange's methods. The former uses a double cross-stitch through the tendon, perforating it in the manner of a figure of eight. Lange secures his tendons by stitching on both sides in the fashion of the continuous suture. The advantage of both methods is that a firm hold is obtained on the tendon without constriction. The technique is considered so reliable that the after-treatment with passive manipulations may be begun a few days after the operation The adaptation of the ends of the tendon may also be accomplished very accurately with this method.

A. STEINDLER.

The Treatment of Paralytic Outward Rotation of the Foot. GWILYM G. DAVIS. *Am. Jour. Orth. Surg.*, August, 1911.

Davis describes a simple operation for correction of outward rotation of the foot following paralysis, which he has used in several cases with satisfaction. It is as follows: The leg and thigh are rotated strongly inward and held by an assistant. An oblique incision is made over the fascia lata. The fascia is then divided longitudinally for about 3 inches parallel to and slightly anterior to the trochanter. The anterior edge of this slit is then sutured to the posterior border of the trochanter with sutures of silk boiled in paraffine. It is, of course, necessary to fix the leg in the position of inward rotation and hold it there until the tissues have firmly united. J. L. PORTER.

Care of Cripples. JOACHIMSTHAL. *Berlin klin. Wochenschr.*, No. 8, 1911.

In making a study of the accommodations of the city of Paris for the care of children with bone and joint tuberculosis, the author gives a minute account of the home this city maintains in Berck-Plage. There is room for not less than 1,110 children in this hospital, which is under the supervision of Dr. Menard. Only poor children are admitted. There are about 300 patients with diseases which permanently confine them to bed, such as tuberculosis of the spine. Two hundred children spend part of the day in bed, while over 500 practically spend the whole day in the open air. Special provision is made for isolating new arrivals. There are also a number of glass cages where children under six years are held under observation for a suitable time. The hospital is fully equipped with operating rooms, gymnasium, and postmortem room. Rest and plaster-of-Paris fixation are used in the treatment to an unusual extent. On the other hand, the children are given ample opportunity for sea baths. There is a school in connection with the hospital. A. STEINDLER.

Sun Ray Treatment (La cure solaire de la tuberculose chirurgicale). ROLLIRE. *Paris med.*, Jan. 7, 1911.

In Rollire's sanitarium in Leysin (France) sun ray treatment is being used for the treatment of surgical tuberculosis with very good results. The use of lenses for condensation is unnecessary because of the absolutely pure atmosphere. To avoid sunburns one should start with local insolation and gradually proceed to general exposures. In tuberculosis of bones and joints the immobilizing bandages are taken off as soon as possible or else windows are cut in the casts so as to expose the affected parts to the sun rays. The sun rays act as germicides, and also have a reducing, soothing and sclerotizing effect. A. STEINDLER.

Boneplasty. STIEDA. *Arch. für klin. Chir.* xciv, 4, 1911.

In a recent study upon the subject the author furnishes some interesting points from his experimental work. Living bone covered with periosteum is the most useful substitute after resection of bone to a great extent. Dead bone implantation does not give permanent and useful results if the implanted bone is of a larger size, the resorption of the implanted bone being completed before sufficient new formation of bone has taken place. For this reason the author thinks that fresh and periosteum-covered bone should be used in bridging large defects of bone. Material from the same individual or from other human bone may be used for the purpose. A. STEINDLER.

Arthrodesis. GAUGELE. *Zeitschr. für orthop. Chir.*, 28, 1911.

The technique of Bade in performing arthrodesis of paralyzed joints is critically reviewed in a study of this subject by Gaugele. Bade's technique consists in driving ivory nails into the joints. In the ankle he drives the nail straight through the os calcis and astragalus into the center of the tibia, while in stiffening the knee joint he uses a diagonal route on both sides of the joint. The author's experiences with this method, however, have not been very encouraging. The main difficulty lies in securing a permanent hold for the pegs, which either become loose or more often break. The broken fragments often cause pressure symptoms and have to be removed by secondary operations. For these reasons the author cannot commend this method in the treatment of paralytic joints.

A. STEINDLER.

ABSTRACTS OF CURRENT LITERATURE

DEPARTMENT OF OBSTETRICS

UNDER THE CHARGE OF

C. S. Bacon, M. D.
Heliodor Schiller, M. D.
Herbert Marion Stowe, M. D.
C. G. Grulee, M. D.

Die erweiterte abdominale Operation bei Carcinoma Colli Uteri. A monograph by Prof. Dr. E. Wertheim. Published by Urban & Schwarzenberg of Berlin and Vienna, 1911.

This new record of Wertheim's personal experience is based on five hundred cases, and comprises an octavo volume of 223 pages in addition to the plates. These plates are excellent reproductions, used entirely to describe the technic of the radical extirpation. Of the bulk of the volume one hundred twenty five pages are given over to a tabulation of the entire series in elaborate detail. Such a table is most valuable to those desiring to study the individual cases.

The text is largely an expression of ideas and theories which have come into the literature since Ries' first publication in 1895 regarding the radical operation for carcinoma of the cervix uteri. This material, however, is here presented systematically, and by those familiar with Wertheim's previous reports must be regarded as authoritative and conclusive. Thus, that chapter devoted to the technical procedure is familiar to all and does not differ, as here presented, from the descriptions in the author's previous papers. The cervical growth is shelled out and cauterized at once before the abdominal section is made and the vagina is packed with a corrosive sublimate ($\frac{1}{1000}$) gauze. The hysterectomy is performed widely, clamps being used at first, these later being replaced by ligatures. In this way a maximum amount of cellular tissue is removed with a minimum of hæmorrhage. Drainage is seldom required, it being usually of the subperitoneal type then. The ureter is found to be peculiarly resistant to cancerous invasion, resection having been rendered necessary but six times in the entire series. When it is cut across immediate reimplantation in the bladder is done. Ureteral fistulæ developed in thirty-six cases, fifteen of which closed spontaneously. Temporary vesical paralysis and cystitis are common complications.

After completing the hysterectomy the peritoneum is split, laying bare the ureters, and all palpably enlarged glands are removed. Plastic peritonization is then performed and thea bdomen is closed.

In Wertheim's clinic practically every operation for cancer of the cervix begins as an exploratory section. Of 940 cases, 73 were explorations only, 21 were vaginal hysterectomies where the patients were very obese or the malignant proliferation merely microscopic, and 500 were the radical operations here reported. The remainder were inoperable. As to operability, this is decided upon after the abdomen is opened, the exact method of treatment then being decided upon. Thus but fifty or sixty per cent. of the cases seen are subjected to the radical operation.

As to results, of the first hundred, thirty died; of the second hundred, twenty-two; third hundred, seventeen; fourth hundred, nine; fifth hundred, fifteen; ninety three in all. Most deaths resulted from peritonitis and pyelonephritis, thirty-nine and nine respectively, though twenty-two succumbed secondarily to cachexia or heart failure. Two hundred fifty of these cases have survived five years or more, but seventy-eight have developed recurrences. This is recognized by the occurrence of pain and cachexia and no feasible operative interference has been devised.

No difference as to outcome was noticed in considering the different varieties of carcinoma, thus proving the long held belief that cancer is cancer wherever found, regardless of cellular variety and that all are equally malignant. Women under thirty in this series, however, seem to have had a better chance than the older for ultimate recovery. They remain permanently well oftener than older patients.

As compared with the vaginal method, Wertheim's series shows as absolute cure in 18.4 per cent., whereas the vaginal gives but 12.6 per cent.

Since this is the last word on uterine carcinoma from one of the greatest authorities, such an elaborate report is of marked interest to every gynecologist. In spite of its breadth and detail a systematic arrangement and a conciseness in expression render the work equally valuable to every physician interested in the question of uterine carcinoma.

Carey Culbertson.

Anaesthesia in Normal Labor. B. EHRLICH. *Gynakol. Rundschau*, h. 19, 1911.

The author states that scopolamin anæsthesia was abandoned because experience has taught that this method has many disadvantages and it is sometimes difficult to awaken the patient from the peculiar dazed condition. Miller's method of cocaine infiltration of the pudendal nerve in the region of the tuber ischii has been applied by Müller in thirty cases out of which eleven showed complete anæsthesia. Sacral anæsthesia, according to Stoeckel, that is, epidural injection by puncturing the sacral canal, with the addition of novocaine and cocaine, did not prove successful.

As to the application of chloroform in labor, there are two methods: Anæsthetizing only during the pains, and the so-called chloroform light sleep. In both cases a trifling quantity of chloroform (from ten to fifteen drops) suffice when given at the beginning of each pain respectively and inhaled for a minute and repeated in two minutes. The latter anæsthesia is the so-called light sleep, for there is no loss of consciousness, the patient replies to loudly spoken questions, but there is a loss of sensibility. There is a complete analgesia of both pains and birth of head and, as a rule, there is a suspension of the memory. Hallauer believed that there might be but suggestive general anæsthesia, as the dose of chloroform is too small to provoke a specific narcotic action. General anæsthesia should be administered as follows: 1. In primiparæ. 2. In those multiparæ who have passed a difficult first delivery or are weakened by previous operations. 3. In cases of kyphoscoliosis or blindness and in diseases of the heart and the kidneys.

EDGAR NEUMANN.

The Toxicity of the Urine in Pregnancy, Labor and Postpartum (Über das Verhalten der Harntoxizität in der Schwangerschaft. Geburt und im Wochenbett). RUPERT FRANZ. *Wien. klin. Wochnschr.*, 1911, xxiv, 1764.

The toxicity of the urine was tested by intra-peritoneal injections into guinea pigs and the severity of the shock estimated by the temperature reaction. Only the writer's conclusions are reported. These conclusions are as follows: (1) the general toxicity of the human urine as estimated by temperature reaction is independent of the concentration, the acid content and the genuine albumin content. (2) Poisonous human urines produce when intraperitoneally injected into guinea pigs the disease picture of protracted anaphylactic shock. (3) The urine of normally pregnant women is not or only slightly more poisonous than that of non-pregnant. (4) The toxicity of the urine of normal pregnant women seems to be slightly increased just before the beginning of labor. At the time of labor the toxicity in comparison with that of pregnancy and postpartum is distinctly increased, and according to my experiences the maximum lies in the second stage, while in the opening period a quick increase can be recognized and in the third stage likewise a similar decrease. Yet in single cases exceptions to this rule can be noted. (6) If the child be dead the labor urine appears none the less toxic. (7) The increase of toxicity during labor is present not only in the birth at the end of pregnancy but also in abortions in the process of uterine and tubal pregnancies. (8) Immediately after birth the urine shows an increased toxicity. (9) The postpartum urine is of somewhat higher toxicity than that of pregnancy and of less than that of labor. The postpartum urine seems to show on the fifth day postpartum a slight increase of toxicity. (10) The urine of labor and postpartum complicated by urticaria has been found to be toxic to a high degree. (11) The urine of eclamptics with no or slight kidney disturbance was to a high degree toxic. (12) In severe nephritis gravidarum, the poison excretion in the urine is either not present or only slight.

Incontrollable Vomiting Treated with Adrenalin. R. ROBINSON. *Académie des Sciences*, April 27, 1911.

The author reported two cases of incontrollable vomiting treated with adrenalin. The first patient was extremely weakened when she was given ten drops of a one per cent adrenalin solution. Vomiting ceased immediately, the patient recovered and was normally delivered.

In the second case the patient was hypodermically injected with ten drops of the same solution. The treatment also proved successful.

From these results the author concludes that there is a rapport between the suprarenal capsules and genital glands. The products of the suprarenal capsules and the genital glands neutralize one another in normal circumstances. In case one of the products prevails, there may occur disturbances unless the other product is substituted by a vicarious organ.

EDGAR NEUMANN.

A Case of Vulcanite Pessary Grown in the Vaginal Wall. DR. BRÓSZ. *Gesellschaft der Spitalsärzte* in Budapest.

The author presented a woman, 44 years of age, who had not removed a vulcanite pessary during a year. The pessary was overgrown by the vaginal wall and completely fixed. The granulations were cut through, the pessary dissected by means of a saw and thus extracted from the vagina.

EDGAR NEUMANN.

Shall We Dislodge Placental Remnants? (Sollen Placentareste gelöst werden?) F. SCHAUTA. *Wien. klin. Wochnschr.*, 1912, xxv, 58.

After long consideration of the subject, Schauta comes to the following conclusions: Placental remains are to be removed, first, under all conditions where no fever is present; second, when fever is present only if the process is confined to the endometrium and uterus and the parametrium, adnexæ and pelvic veins are completely free; third, in spite of disease of the parametrium, adnexæ, and veins in indicatio vitalis on account of severe hæmorrhage.

BOOK REVIEWS

THE TREATMENT OF FRACTURES: With Notes upon a Few Common Dislocations. By Chas. L. Scudder, M. D. Seventh Edition. Philadelphia and London: W. B. Saunders Company, 1911.

The new seventh edition of this well-known standard work appears in larger form and more complete than before, and in it the author has incorporated the advances made in the last few years in this important department of surgery. The treatment of fractures received a wonderful impetus with the advent of the Röntgen rays, and at the present time the operative treatment of fractures is being extensively practiced.

New material in the text and many new X-ray pictures have been added to the chapters on Fracture of the Skull, Fractures of the Spine, Injury to the Musculo-spiral Nerve, Fractures of the Neck of the Femur, and Fractures of the Leg.

There is a series of unselected cases of injury to the lower end of the humerus, illustrating the anatomical and functional results five years after the accident. Text-books should contain more of this sort of material, showing by means of X-rays the ultimate results obtained by the methods of treatment taught. A noticeable improvement in the book is the elimination of some of the X-ray tracings of the older editions and the addition of many very instructive X-ray photographs.

There is a new chapter on the Operative Treatment of Fractures which reflects the conservatism and attitude of great reserve which Scudder maintains regarding this method of treating simple fractures. Thus, we read, "The broad indications for operation, in my opinion, on recent closed fractures, in the absence of great damage to soft parts, including vessels and nerves, is the inability to bring fragments into such apposition and alignment that good functional results will follow in a reasonable time." Again, "It must be kept in mind that a very definite indication for operation must be present before any individual case is submitted to the additional risk of incision and direct fixation."

Furthermore, "Deficencies in nonoperative treatment should be remedied, not by operating more frequently, but by exercising greater care in the employment of the fundamental principles recognized the world over as underlying the nonoperative treatment of all fractures namely, general anæsthesia; traction, counter-traction; pressure, counter-pressure; the exact application of anatomic knowledge; immobilization; the comparative use of the Röntgen ray; massage; the care of joints adjacent to the injury, and thus ultimately securing approximately anatomic form and perfect function." Scudder thinks where this is done the operative margin will be narrow, and there is no question that he is right. WILLIAM HESSERT.

SURGICAL AFTER-TREATMENT. A manual of the conduct of surgical convalescence. By L. R. G. Crandon, A. M., M. D. Philadelphia and London: W. B. Saunders Company, 1911.

The author states in a preface that this work is intended for the house surgeon who has as yet not become familiar with this important phase of surgery, and the general practitioners in communities which are not surgical centers; yet it is so thorough and far-reaching that any physician, even though his experience be extensive, may study it with profit.

In Part I he discusses general topics. The subject of transfusion is taken up thoroughly, although practically, describing the technique according to Crile and giving its indications and results. He takes up such postoperative complications and sequelæ as shock, nephrites, hiccough, acetonuria, gastric dilatation, and ethers. Each is very interesting lydiscussed, especially shock, to which he gives considerable attention. The local complications, such as infection and sepsis with the application of Bier's hyperæmia treatment, hæmorrhage, fistula formation and others, are in turn taken up and their treatment outlined.

Part II takes up regional surgery. In the chapter on operations on the neck he describes in detail intubation. Under throid surgery he discusses the treatment of thyroid intoxication with Beebe's serum and the results. In abdominal operations he discusses the formation of jejunal and gastrojejunal ulcers after gastroenterostomy.

He also tabulates a diet to be used for healed gastric ulcer cases to prevent recurrence.

Under appendicitis he details the case from the dressing immediately after the operation, depending on the nature of the case; the possible complications, and when they are most likely to appear, their diagnostic symptoms and how they should be treated.

In a chapter devoted to operations on the uterus, vagina, and adnexæ he takes up such conditions as abortion, Cæsarean section, and eclampsia in a brief but instructive way.

One chapter on therapeutic immunization and vaccine therapy is written by Geo. P. Sanborn, M. D. Here the author discusses the opsonic index and the technique of its determination; autoinoculation; the preparation of vaccines and the indications for their use and dosage. He then

takes up such conditions as septicæmia, gonorrheal arthritis, furunculosis, acne, and many others and outlines the method of treatment by vaccines. The subject of tuberculosis in regard to tuberculin tests and tuberculin therapy is reviewed in its various phases, depending on its location.

In an appendix the author gives a number of food recipes for convalescents.

The subject material is well handled; enough text to be thorough yet not to be tiresome to read. The work is peculiarly free from any apparent personal "fads," the author adhering to the approved principles of surgery and freely quoting from literature and personal observations of prominent surgeons' work. One can say that this work is a valuable addition to the present literature on surgery.

J. A. WOLFER.

PRACTICAL PATHOLOGY. By Alfred Scott Warthin, Ph. D. M. D. Ann Arbor, Mich.: Geo. Wahr.

This second edition, rewritten and enlarged, is a manual of autopsy and laboratory technique and is dedicated to Professor Alexander Kolisko of Vienna, in whose laboratories the author spent much time and study. The first part is devoted to the technique of autopsy and is built up from the methods of Rokitansky, Virchow, Chiari, and Nauwerck, together with some modifications by the author and used by him in teaching.

The second part deals with the treatment of materials procured at autopsy, giving methods both general and special, depending upon the character of the tissue in hand and treatment required to bring out special details, comprising the technique of examination of fresh material, processes of imbedding and staining. The work has been brought up to date in methods of staining required to bring out pathological conditions of tissue and cells as well as in its demonstration of pathogenic bacteria.

The number of various methods has been restricted to those which in the experience of the author have yielded uniformly the best results.

H. A. POTTS.

PRACTICAL CYSTOSCOPY. By Paul M. Pilcher, M. D. New York: Paul B. Hoeber, 1912.

This is the first text-book written on the subject of cystoscopy in America. In reviewing this book we note that the historical side of cystoscopy has been omitted, and that Nitze, the father of cystoscopy, receives only passing mention for his immortal work.

The book contains 233 illustrations, 29 of them being in colors, and these are to be highly commended. The author's diagrammatic presentation of various kidney lesions is a unique feature of the book. The normal outline of the kidney, ureter and bladder are given in red and the pathology is outlined in black.

Details of cystoscopic technique, such as preparation of patients, sterilization of instruments, etc., are carefully given, and should be a source of much information to beginners in cystoscopy.

Modern clinical diagnostic methods, which are more or less direct outgrowths of cystoscopy, are incorporated, thereby bringing the book up to date. The chapter in functional kidney diagnosis contains references to cryoscopy, phlödzin and indigocarmine tests as well as the recently elaborated phenolsulphonephthalein test of Geraghty and Rowntree.

In his consideration of pyelography the author fails to give credit to Voelcker of Heidelberg for his work.

The value and uses of the shadowgraph are carefully considered and well illustrated. Attention is also given to the diagnosis and treatment of the pyelitis of pregnancy.

The book is well written and illustrated and contains much valuable information not found in other books on cystoscopy.

HERMAN L. KRETSCHMER.

ONE HUNDRED SURGICAL PROBLEMS. By James G. Mumford, M. D. Boston: W. M. Leonard, 1911.

This very interesting little book consists of a recitation of one hundred surgical cases, each illustrating either a diagnostic or prognostic point, or some interesting phase in the treatment.

Each case is presented by giving a clinical history supplemented by notes explaining certain symptoms or symptom phenomena, discussing their diagnostic importance; by a report of a careful examination; by the course of treatment followed, with a statement of conditions as found at operation, and in most instances by the subsequent history.

The cases are classified into various groups, depending upon the part affected or their symptom complex.

He recites a number of very interesting cases of enteroptosis which are characterized by digestive disorders and the uniform good results obtained by applying a well fitting corset belt. Under this topic, he emphasizes the importance of a very careful examination, as these cases so closely resemble appendicitis, gall-bladder or stomach disease. He includes in his text a number of good illustrative X-ray pictures and strongly advocates the use of the X-rays in the diagnosis of this condition.

Under the subject "Toxæmias" he reports a very interesting series of cases of hyperthyroidism. Some of these cases were cured as if by magic by operation, removal of the greater part of the gland, and others were but little if any benefited by the same procedure. He strongly advocates the theory that hyperthyroidism may be only a symptom of some obscure process, suggesting a probable intestinal intoxication.

One must say that the author has placed before the profession a very interesting little book, and the most skilled surgeon may read it with profit.

J. A. WOLFER.

CLINICAL CONGRESS OF SURGEONS OF NORTH AMERICA

Third Annual Meeting to be held in New York City, November 11 to 16, 1912

ALBERT J. OCHSNER, M. D., President — EDWARD MARTIN, M. D., President-Elect
JOHN G. CLARK, M. D., Vice-President — GEORGE E. BREWER, M. D., Vice-President-Elect
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LEROY BROUN, M. D.
LOUIS J. LADINSKI, M. D.
JOHN E. WEEKS, M. D.
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E. W. STUDDIFORD, M. D.
WALTON MARTIN, M. D.
ALFRED S. TAYLOR, M. D.
L. G. COLE, M. D.

MEMBERSHIP IN THE CLINICAL CONGRESS OF SURGEONS OF NORTH AMERICA

THE startling success of the first two meetings of the Clinical Congress of Surgeons of North America, one in Chicago in November, 1910, and the other in Philadelphia, in 1911, together with the announcement of the third meeting to be held in New York City, has prompted an inquiry from surgeons in all parts of the country with regard to the membership of the Congress.

While the organization of the Congress has as a central basis a body of representatives elected from among the surgeons attending the annual meeting, the constitution of the Congress provides that the subscribers to the official journal of the Congress, SURGERY, GYNECOLOGY AND OBSTETRICS, are automatically members of the Congress and will therefore receive an invitation to its sessions, and that any physician, whether a subscriber to SURGERY, GYNECOLOGY AND OBSTETRICS or not, may obtain an invitation to any annual meeting by signifying his desire to the General Secretary.

In accordance with the above facts, formal invitations to attend the Congress will be issued three weeks in advance of each meeting, not only to the subscribers to its official organ but also to all surgeons and physicians in good standing in the United States and

Canada, who have asked for an invitation and who in accordance with that request, have been placed upon the invitation list by the General Secretary.

In lieu of annual dues which are usually exacted from members of medical societies, without regard to their attendance at the regular meetings, the Clinical Congress requires a registration fee, not to exceed $5.00, from those who *actually attend* the annual sessions. The registration fee is provided exclusively for paying all expenses incident to each session of the Congress and for printing its volume of transactions. No part of it is appropriated for paying the expense of publishing its official organ, and for that reason, the subscribers to SURGERY, GYNECOLOGY AND OBSTETRICS are not exempt from paying the registration fee. In other words, the financial arrangements of the Clinical Congress of Surgeons of North America and of its official journal are absolutely independent. Hence the registration fee of the Congress is used exclusively for the expenses of the Congress. It is the desire of the Executive Committee that no financial responsibility of any kind shall be placed upon the medical profession in the city providing the clinical program.

All communications regarding invitations should be addressed to Franklin H. Martin, M. D., General Secretary, 31 North State Street, Chicago.

PRELIMINARY PROGRAMS OF CLINICS FOR THE NEW YORK MEETING

IT is with great pleasure that we publish the first preliminary programs of the New York meeting of the Congress. These programs—the general gynecological and obstetrical program under the chairmanship of Dr. LeRoy Broun, the general genito-urinary program under the chairmanship of Dr. J. Bentley Squier, and the general Brooklyn program under the chairmanship of Dr. R. L. Dickinson—argue great interest for the program in its completed form.

The preparation of the programs on general surgery, orthopedic surgery, eye, ear, nose, and throat surgery, and general surgical laboratory demonstrations is well under way, and preliminary announcements will be published as rapidly as the programs are completed. Clinical material will be more abundant than at any previous meeting. Announcement of the preliminary program of the important evening literary sessions will appear in the May number of this journal.

GYNECOLOGICAL AND OBSTETRICAL CLINICS

Monday, November 11th.

J. BRETTAUER, S. M. BRICKNER and R. T. FRANK — Mount Sinai Hospital — 9 to 2. Gynecological operations.

L. J. LADINSKI — Polyclinic Hospital — 9 to 10. Gynecological operations.

ROBERT. WYLIE — Polyclinic Hospital — 3 to 5. Gynecological operations.

CLEMENT CLEVELAND with E. W. PINKHAM — Woman's Hospital — 9 to 11. Gynecological operations.

HERMAN GRAD and W. M. FORD — Woman's Hospital — 9 to 10. Demonstration of Hospital, Laboratories, Technique and after-care. 10 to 11 —Demonstration of postoperative results.

DOUGAL BISSELL with EVERETT M. HAWKS — Woman's Hospital — 2 to 6. Gynecological operations.

GEORGE H. MALLET — General Memorial Hospital — 2 to 6. Gynecological operations.

JAMES N. WEST — Post-Graduate Hospital — 9 to 12 Gynecological operations.

ATTENDING STAFF — Lying-In Hospital — 9 to 10. Demonstration of Hospital, Laboratories, cases, methods, etc.

JAMES A. HARRAR — Lying-In Hospital — 10 to 11. Demonstration of examination of pregnant women and pelvic measurement.

JAMES W. MARKOE and A. B. DAVIS — Lying-In Hospital — 2:30 to 3:30. Obstetrical and gynecological operations.

L. L. DANFORTH — Homeopathic Medical College and Flower Hospital — 5 to 6. Obstetrical operations.

E. P. SWIFT — Hahnemann Hospital — 5:30. Obstetrical operations.

J. CLIFTON EDGAR, or AUSTIN FLINT, JR., or C. C. BARROWS — Manhattan Maternity Hospital — 2 to 3:30. Demonstration of the management and technique of the hospital. Obstetrical operations.

Tuesday, November 12th.

HOWARD C. TAYLOR with WM. P. HEALY — Roosevelt Hospital — 2:30 to 6. Gynecological operations.

L. J. LADINSKI — Beth Israel Hospital — 9. Gynecological operations.

S. W. BANDLER — Beth Israel Hospital — 2. Gynecological operations.

F. FOERSTER — German Hospital — Gynecological operations.

RALPH WALDO and GUSTAV SEELIGMANN — Lebanon Hospital — Gynecological operations.

H. S. STEARNS and C. G. CHILD, Jr. — City Hospital — 2. Gynecological operations.

F. KRUG with H. N. VINEBERG and S. WIENER — Mount Sinai Hospital — 9 to 2. Gynecological operations.

LEROY BROUN with R. M. RAWLS — Woman's Hospital — 9 to 12. Gynecological operations.

C. G. CHILD and EVERETT M. HAWKS — Woman's Hospital — 9 to 10. Demonstration of Hospital, Wards, Laboratories and Technique. 10.— Demonstration of postoperative results.

P. F. CHAMBERS with HERMAN GRAD — Woman's Hospital — 2 to 6. Gynecological operations.

JOSEPH C. TAYLOR — Polyclinic Hospital — 8 to 10. Gynecological operations.

BROOKS H. WELLS — Polyclinic Hospital — 3 to 5. Gynecological operations.

G. G. WARD, Jr. — Post-Graduate Hospital — 9 to 12. Gynecological operations.

E. G. TUTTLE — Homeopathic Medical College Hospital and Flower Hospital — 10 to 12. Gynecological operations.

HOMER I. OSTROM — Metropolitan Hospital, Blackwell's Island — 2:30. Gynecological operations.

GEORGE WATSON ROBERTS — Hahnemann Hospital — 8:30. Gynecological operations.

WM. F. HONAN — Hahnemann Hospital — 2:30. Gynecological operations.

EDWIN B. CRAGIN — Sloane Hospital for Women — 3. Obstetrical operations.

ATTENDING STAFF — Lying-In Hospital — 9 to 10. Demonstration of Laboratories, Wards, After-care, Museums, etc.

WILLIAM A. MORGAN — Lying-In Hospital — 10 to 11. Demonstration of conduct of labor, position, technique.

JAMES W. MARKOE and A. B. DAVIS — Lying-In Hospital — 2:30 to 3:30. Obstetrical and gynecological operations.

ROBERT L. DICKINSON, RALPH H. POMEROY and AUGUSTUS A. HUSSEY — Brooklyn Hospital — 9 to 12:30. Gynecological operations.

G. MacNAUGHTON — Jewish Hospital, Brooklyn — 9 to 12. Gynecological operations.

J. O. POLAK — Jewish Hospital, Brooklyn — 2 to 6. Gynecological operations.

O. P. HUMPSTONE — Jewish Hospital, Brooklyn — 2 to 5. Obstetrical clinic.

J. CLIFTON EDGAR, or AUSTIN FLINT, Jr., or C. C. BARROWS — Manhattan Maternity Hospital — 2 to 3:30. Demonstration of the management and technique of the hospital.

W. M. POLK and C. C. BARROWS — Bellevue Hospital. Gynecological operations.

ROBERT H. WYLIE and G. B. LEE — Bellevue Hospital — 9. Gynecological operations. Demonstration of after-treatment of operative cases, and of treatment of patients before operation.

CAROLINE S. FINDLEY — New York Infirmary for Women and Children — 2:30. Obstetrical operations.

Wednesday, November 13th

EDWIN B. CRAGIN — Sloane Hospital for Women — 3. Gynecological operations.

H. J. BOLDT — Post-Graduate Hospital — 9. Gynecological operations.

J. RIDDLE GOFFE — New York Polyclinic Hospital — 8. Gynecological operations.

CLINTON L. BAGG — Metropolitan Hospital (Homeopathic) — 2:30. Gynecological operations.

AUSTIN FLINT, Jr., with W. M. FORD — Woman's Hospital — 9 to 12. Gynecological operations.

C. G. CHILD, Jr., and HERMAN GRAD — Woman's Hospital — 9 to 10. Demonstration of Hospital, Wards, Laboratories and Technique. 11.— Demonstration of postoperative results.

CLEMENT CLEVELAND with E. W. PINKHAM — Woman's Hospital — 2 to 6. Gynecological operations.

ATTENDING STAFF — Lying-In Hospital — 9 to 10. Demonstration of Wards, Laboratories, After-care, Museums, etc.

ROSS MacPHERSON — Lying-In Hospital — 10 to 11. Demonstration of postpartum treatment.

JAMES W. MARKOE and A. B. DAVIS — Lying-In Hospital — 2:30 to 3:30. Gynecological and obstetrical operations.

LEROY BROUN — Manhattan State Hospital — 2:30. Gynecological operations.

SAMUEL BARLOW MOORE — Metropolitan Hospital (Homeopathic) — 2:30. Obstetrical operations.

J. CLIFTON EDGAR, or AUSTIN FLINT, Jr., or C. C. BARROWS — Manhattan Maternity Hospital — 2 to 3:30. Demonstration of the management and technique of the hospital. Obstetrical operations.

H. C. COE and W. H. STUDDIFORD — Bellevue Hospital — 9. Gynecological operations. Demonstration of after-care of operative cases, and of treatment of patients before operation.

MARY D. RUSHMORE — New York Infirmary for Women and Children — 2:30. Gyneological operations.

Thursday, November 14th

L. J. LADINSKI — Beth Israel Hospital — 2. Gynecological operations.

S. W. BANDLER — Beth Israel Hospital — 9. Gynecological operations.

HOWARD C. TAYLOR with WILLIAM P. HEALY — Roosevelt Hospital — 2:30. Gynecological operations.

JAMES N. WEST — Post-Graduate Hospital — 9 to 12. Gynecological operations.

HENRY C. COE — General Memorial Hospital — 9. Gynecological operations.

GEORGE H. MALLETT — General Memorial Hospital — 11. Gynecological operations.

E. H. GRANDIN — Columbus Hospital — 2. Gynecological operations.

L. J. LADINSKI — Polyclinic Hospital — 8 to 10. Gynecological operations.

ROBERT WYLIE — Polyclinic Hospital — 3 to 5. Gynecological operations.

GUSTAV SEELIGMANN and RALPH WALDO — Lebanon Hospital — 9 and 2. Gynecological operations.

HOMER I. OSTROM — Metropolitan Hospital (Homeopathic) — 2:30. Gynecological operations.

F. KRUG, H. N. VINEBERG, and S. WIENER — Mount Sinai Hospital — 9. Gynecological operations.

J. RIDDLE GOFFE with C. G. CHILD, JR. — Woman's Hospital — 9. Gynecological operations.

LEROY BROUN with REGINALD M. RAWLS — Woman's Hospital — 2. Gynecological operations.

W. M. FORD and EVERETT M. HAWKS — Woman's Hospital — 9 to 10. Demonstration of Hospital, Wards, Laboratories, Technique, etc. 10 to 11. — Demonstration of postoperative results.

J. O. POLAK — Long Island College Hospital — 9 to 12. Gynecological operations.

A. M. JUDD — Jewish Hospital — 9 to 12. Gynecological and obstetrical operations.

ATTENDING STAFF — Lying-In Hospital — 9 to 10. Demonstration of Wards, Laboratories After-care, Muesums, etc.

CLINTON B. KNAPP — Lying-In Hospital — 10 to 11. Demonstration of new-born children, treatment of eyes, etc., also demonstrating placentæ.

JAMES W. MARKOE and A. B. DAVIS — Lying-In Hospital — 2:30 to 3:30. Gynecological and obstetrical operations.

C. G. CHILD, JR., or H. S. STEARNES — City Hospital — 2. Gynecological operations.

F. A. DORMAN — City Hospital — 2. Obstetrical operations.

JAMES D. VOORHEES — Sloane Hospital for Women — 2. Obstetrical operations.

P. C. THOMAS — Hahnemann Hospital — 2:30. Obstetrical clinic.

FREDERICK HOLDEN and N. P. GEIS — Long Island College Hospital — 9. Obstetrical operations.

J. CLIFTON EDGAR, or AUSTIN FLINT, JR., or C. C. BARROWS — Manhattan Maternity Hospital — 2 to 3:30. Demonstration of the management and technique of the hospital. Obstetrical operations.

W. M. POLK and C. C. BARROWS — Bellevue Hospital — 9. Gynecological operations. Demonstration of after-treatment of operative cases, and of treatment of patients before operation.

Friday, November 15th

F. FOERSTER — German Hospital — Gynecological operations.

GEORGE GRAY WARD, JR. — Post-Graduate Hospital — 9 to 12. Gynecological operations.

C. F. ADAMS — Columbus Hospital — 2. Gynecological operations.

CLINTON L. BAGG — Metropolitan Hospital (Homeopathic) — 2:30. Gynecological operations.

W. G. CRUMP — Homeopathic Medical College and Flower Hospital — 2 to 4. Gynecological operations.

JOSEPH C. TAYLOR — Polyclinic Hospital — 8 to 10. Gynecological operations.

J. BRETTAUER, S. M. BRICKNER and R. T. FRANK — Mount Sinai Hospital — 9. Gynecological operations.

P. F. CHAMBERS with HERMAN GRAD — Woman's Hospital — 9 to 11. Gynecological operations.

R. M. RAWLS and E. W. PINKHAM — Woman's Hospital — 9 to 10. Demonstration of Hospital, Laboratories, Technique and After-care. 10 to 11. — Demonstration of postoperative results.

J. RIDDLE GOFFE with C. G. CHILD, JR. — Woman's Hospital — 2 to 6. Gynecological operations.

LEROY BROUN — Manhattan State Hospital — 2:30. Gynecological operations.

ATTENDING STAFF — Lying-In Hospital — 9 to 10. Demonstration of Wards, Laboratories, After-care, Museums, etc.

C. F. JELLINGHAUS — Lying-In Hospital — 10 to 11. Demonstration of postoperative cases.

JAMES W. MARKOE and A. B. DAVIS — Lying-In Hospital — 2:30 to 3:30. Gynecological and obstetrical operations.

R. L. DICKINSON, RALPH H. POMEROY and AUGUSTUS A. HUSSEY — Brooklyn Hospital — 9 to 12. Gynecological operations.

F. A. DORMAN — Sloane Hospital for Women — 3. Obstetrical clinic.

JOHN HUDSON STORER — Metropolitan Hospital (Homeopathic) — 2:30. Obstetrical clinic.

L. L. DANFORTH — Homeopathic Medical College and Flower Hospital — 5 to 6. Obstetrical clinic.

J. CLIFTON EDGAR, or AUSTIN FLINT, JR., or C. C. BARROWS — Manhattan Maternity — 2 to 3. Demonstration of the management and technique of the hospital. Obstetrical operations.

ROBERT H. WYLIE and G. B. LEE — Bellevue Hospital — 9. Gynecological operations. Demonstration of after-treatment of operative cases, and of treatment of patients before operation.

Saturday, November 16th

HOWARD C. TAYLOR with WILLIAM P. HEALY — Rooseyelt Hospital — 2:30. Gynecological operations.

H. J. BOLDT — Post-Graduate Hospital — 9 to 12. Gynecological operations.

EDWIN B. CRAGIN — Sloane Hospital for Women — 3. Gynecological operations.

C. G. CHILD — Polyclinic Hospital — 8 to 10. Gynecological operations.

BROOKS H. WELLS — Polyclinic Hospital — 3 to 5. Gynecological operations.

G. WATSON ROBERTS — Hahnemann Hospital — 8:30. Gynecological operations.

DOUGAL BISSELL with EVERETT M. HAWKS — Woman's Hospital — 9. Gynecological operations.

R. M. RAWLS and E. W. PINKHAM — Woman's Hospital — 9 to 10. Demonstration of Hospital, Laboratories, Technique, and After-care. 10.— Demonstration of postoperative cases

AUSTIN FLINT, JR., with W. M. FORD — Woman's Hospital — 2 to 6. Gynecological operations.

ATTENDING STAFF — Lying-In Hospital — 9 to 10. Demonstration of Wards, Laboratories, After-care, Museums, etc.

GEORGE W. KOSMAK — Lying-In Hospital — 10 to 11. Demonstration of care of cases of labor at patients' homes.

JAMES W. MARKOE and A. B. DAVIS — Lying-In Hospital — 2:30 to 3:30. Gynecological and obstetrical operations.

J. O. POLAK — Jewish Hospital — 9 to 12. Gynecological operations.

J. CLIFTON EDGAR, or AUSTIN FLINT, JR., or C C. BARROWS — Manhattan Maternity Hospital — 2 to 3:30. Demonstration of the management and technique of the hospital. Obstetrical clinics.

O. P. HUMPSTONE — Jewish Hospital — 9 to 12. Obstetrical clinics.

J. O. POLAK, PALMER and POOL — Long Island College Hospital — 8 to 12. Gynecological operations.

H. C. COE and W. E. STUDDIFORD — Bellevue Hospital — 9. Gynecological operations. Demonstrations of the after-treatment of operative cases, and of the treatment of patients before operation, etc.

CLINICS IN BROOKLYN HOSPITALS

Monday, November 11th

W. C. WOOD — Brooklyn Hospital — 10 to 12. Surgical operations.

J. E. JENNINGS — Brooklyn Hospital — 2 to 4. Surgical operations.

W. H. STEERS and P. H. RAYNOR — Brooklyn Eye and Ear Hospital — 2 to 4. Nose and throat clinics.

H. A. ALDERTON — Brooklyn Eye and Ear Hospital — 2. Ear operations.

W. S. SHATTUCK, J. C. RUSHMORE and J. W. INGALLS — Brooklyn Eye and Ear Hospital — 2 to 4. Eye clinics.

J. S. WOOD and W. H. SNYDER — Brooklyn Eye and Ear Hospital — 3 to 4. Eye operations.

W. RANKIN — Coney Island Hospital — 11 to 1. Gynecological operations.

A. H. BOGART — Coney Island Hospital — 2 to 4. Surgical operations.

W. R. ISZARD — Cumberland Street Hospital — 9 to 11. Genito-urinary clinic.

C. E. PAINE — Cumberland Street Hospital — 2 to 3. Nose and throat clinic.

B. H. SHEA — Cumberland Street Hospital — 4 to 5. Ear operations.

R. S. FOWLER — German Hospital — 10 to 1. Surgical operations.

B. HARRIS — German Hospital — 10. Genito-urinary clinic.

W. LINDER — Jewish Hospital — 9 to 12. Surgical operations.

W. L. DUFFIELD — Jewish Hospital — 2 to 4. Surgical operations.

V. H. PENTLARGE — Jewish Hospital — 2 to 4. Genito-urinary clinic.

S. T. McNAMARA — Kings County Hospital — 10 to 12. Gynecological operations.

C. W. NAPIER — Kings County Hospital — 2 to 3. Orthopedic operations.

H. ARROWSMITH — Kings County Hospital — 2 to 4. Nose and throat operations.

W. TRUSLOW — Kings County Hospital — 3 to 4. Orthopedic operations.

J. C. RUSHMORE — Long Island College Hospital — 9 to 12. Surgical operations.

H. H. MORTON — Long Island College Hospital — 2 to 4. Genito-urinary operations.

J. B. BOGART — Methodist Episcopal Hospital — 9 to 11. Surgical operations.

W. A. SHERWOOD — Methodist Episcopal Hospital — 11 to 1. Surgical operations.

W. TRUSLOW — Methodist Episcopal Hospital — 2 to 3. Orthopedic clinic.

H. B. DELATOUR — Norwegian Hospital — 9 to 11. Gynecological and surgical operations.

P. M. PILCHER — Pilcher Private Hospital — 9 to 12. Surgical operations.

J. F. RANKIN — Prospect Heights Hospital. Gynecological clinic.

O. S. RITCH — Prospect Heights Hospital — 3 to 5. Surgical operations.

J. D. SULLIVAN — St. Mary's Hospital — 10 to 1. Surgical operations.

W. L. CHAPMAN — Swedish Hospital — 10 to 12. Surgical operations.

Tuesday, November 12th

R. H. POMEROY — Brooklyn Hospital — 9 to 12. Gynecological operations.

W. H. CARY — Brooklyn Hospital — 2 to 4. Gynecological clinic.

A. A. HUSSEY — Brooklyn Hospital — 2 to 4. Obstetrical operations.

C. CRANE — Brooklyn Hospital — 2. Nose and throat clinic.

H. H. ARROWSMITH and F. L. TUCKER — Brooklyn Eye and Ear Hospital — 2 to 4. Nose and throat clinics.

W. C. BRAISLIN and S. H. LUTZ — Brooklyn Eye and Ear Hospital — 2 to 4. Ear clinics.

H. H. WAUGH — Brooklyn Eye and Ear Hospital — 2 to 3. Eye operations.

W. SIMMONS and N. L. NORTH — Brooklyn Eye and Ear Hospital — 2 to 4. Eye clinics.

D. W. MEYER — Brooklyn Eye and Ear Hospital — 3 to 4. Eye operations.

E. H. FISKE — Coney Island Hospital — 2 to 4. Surgical operations.

R. F. WALMSLEY — Cumberland Street Hospital — 1 to 3. Surgical operations.

S. W. PALLISTER — Cumberland Street Hospital — 3 to 5. Surgical operations.

J. P. WARBASSE — German Hospital — 10 to 1. Surgical operations.

M. L. BODKIN — German Hospital — 2 to 4. Rectal operations.

J. DOWNEY — Holy Family Hospital — 2 to 4. Surgical operations.

J. O. POLAK — Jewish Hospital — 9 to 12; 2 to 4. Gynecological operations.

O. P. HUMPSTONE — Jewish Hospital — 2 to 4. Obstetrical operations.

P. H. STURGES — Jewish Hospital — 2 to 3. Nose and throat operations.

A. C. HOWE — Jewish Hospital — 3 to 4. Nose and throat operations.

A. T. BRISTOW — Kings County Hospital — 10 to 12. Surgical operations.

G. McNAUGHTON — Long Island College Hospital — 9 to 12. Gynecological operations.

J. KEPKE — Long Island College Hospital — 2 to 4. Nose and throat operations.

T. B. SPENCE — Methodist Epsicopal Hospital — 9 to 11. Surgical operations.
W. F. CAMPBELL — Methodist Episcopal Hospital — 11 to 1. Surgical operations.
R. S. FOWLER — Methodist Episcopal Hospital — 2 to 4. Surgical operations.
E. D. FERRIS — Norwegian Hospital — 10 to 12. Gynecological and surgical operations.
P. M. PILCHER — Pilcher Private Hospital — 9 to 12. Surgical operations.
J. F. RANKIN — Prospect Heights Hospital. Gynecological clinic.
E. J. McENTEE — St. Catherine's Hospital — 9 to 12. Surgical operations.
J. MEYER — St. Catherine's Hospital — 3 to 4. Nose and throat operations.
W. S. SIMMONS — St. John's Hospital — 10 to 12. Surgical operations.
J. C. KENNEDY — St. Mary's Hospital — 9 to 12. Surgical operations.
J. M. CLAYLAND — St. Mary's Hospital — 2 to 4. Orthopedic operations.
L. G. BALDWIN — St. Peter's Hospital — 9 to 12. Gynecological operations.
J. F. TODD — St. Peter's Hospital — 11 to 1. Gynecological operations.
C. DUNCAN — Swedish Hospital — 10 to 12. Gynecological operations.
R. J. MORRISON — Williamsburgh Hospital — 9 to 12. Surgical operations.
A. WADE — Williamsburgh Hospital — 2 to 3. Gynecological operations.
L. A. McCLELLAND — Williamsburgh Hospital — 2 to 3. Nose and throat operations.

Wednesday, November 13th

R. W. WESTBROOK — Brooklyn Hospital — 10 to 12. Surgical operations.
N. P. RATHBUN — Brooklyn Hospital Dispensary — 2 to 4. Genito-urinary clinic.
H. ARROWSMITH — Brooklyn Eye and Ear Hospital — 2 to 4. Nose and throat clinic.
W. S. SHATTUCK — Brooklyn Eye and Ear Hospital — 2 to 4. Ear clinic.
F. DE F. BAILEY — Brooklyn Eye and Ear Hospital — 2. Eye operations.
C. N. COX — Brooklyn Eye and Ear Hospital — 2. Ear operations.
J. C. McEVITT — Coney Island Hospital — 11 to 1. Gynecological operations.
E. MAYNE — Coney Island Hospital — 11 to 1. Gynecological operations.
J. J. MURPHY — Coney Island Hospital — 2 to 4. Surgical operations.
C. BURNHAM — Cumberland Street Hospital — 1 to 3. Gynecological operations.
F. WEISBROD — German Hospital — 10 to 1. Surgical operations.
E. H. FISKE — Holy Family Hospital — 2 to 4. Surgical operations.
W. LINDER — Jewish Hospital — 9 to 12. Surgical operations.
W. L. DUFFIELD — Jewish Hospital — 2 to 4. Surgical operations.
V. H. PENTLARGE — Jewish Hospital — 2 to 4. Genito-urinary clinic.
M. G. WASCH — Jewish Hospital — 2 to 4. X-ray clinic.
A. M. JUDD — Kings County Hospital — 10 to 12. Gynecological operations.
H. H. MORTON — Kings County Hospital — 10 to 12. Genito-urinary operations.
J. S. WOOD — Kings County Hospital — 2 to 4. Eye operations.
C. W. NAPIER — Kings County Hospital — 2 to 3. Orthopedic operations.
W. TRUSLOW — Kings County Hospital — 3 to 4. Orthopedic operations.
W. B. BRINSMADE — Long Island College Hospital — 10 to 12. Surgical operations.
P. H. STURGES — Long Island College Hospital — 1 to 3. Nose and throat clinic.
J. E. SHEPPARD — Long Island College Hospital — 3 to 4. Ear operations.
J. B. BOGART — Methodist Episcopal Hospital — 9 to 11. Surgical operations.
C. H. GOODRICH and W. A. SHERWOOD — Methodist Episcopal Hospital — 11 to 1. Surgical operations.
R. DURHAM — Methodist Episcopal Hospital — 11. Genito-urinary clinic.
P. M. PILCHER — Pilcher Private Hospital — 9 to 12. Surgical operations.
J. F. RANKIN — Prospect Heights Hospital. Gynecological clinic.
S. W. PALLISTER — Prospect Heights Hospital — 3 to 5. Surgical operations.
H. B. DELATOUR — St. John's Hospital — 9 to 12. Gynecological and surgical operations.
J. R. KEVIN — St. Mary's Hospital — 9 to 12. Surgical operations.
J. C. McEVITT — St. Mary's Hospital — 2 to 4. Gynecological operations.
W. GARDNER and L. T. JACKMAN — Samaritan Hospital — 2 to 4. Nose and throat operations.
L. A. LYNCH — Swedish Hospital — 10 to 12. Surgical operations.

Thursday, November 14th

R. L. DICKINSON — Brooklyn Hospital — 9 to 12. Gynecological operations.
J. E. JENNINGS — Brooklyn Hospital — 2 to 4. Surgical operations.
A. A. HUSSEY — Brooklyn Hospital — 2 to 4. Obstetrical operations.
F. A. HULST — Brooklyn Hospital — 2 to 4. Pathological laboratory exhibit.
H. ARROWSMITH — Brooklyn Eye and Ear Hospital — 1:30 to 3:30. Nose and throat operations.
P. H. RAYNOR and W. H. STEERS — Brooklyn Eye and Ear Hospital — 2 to 4. Nose and throat clinics.
B. C. COLLINS — Brooklyn Eye and Ear Hospital — 2 to 4. Ear clinic.
W. S. SHATTUCK — Brooklyn Eye and Ear Hospital — 3:30 to 5. Ear operations.
J. S. WOOD and W. H. SNYDER — Brooklyn Eye and Ear Hospital — 2 to 4. Eye clinics.
J. W. INGALLS — Brooklyn Eye and Ear Hospital — 2 to 3. Eye operations.
W. SIMMONS — Brooklyn Eye and Ear Hospital — 3 to 4. Eye operations.
C. E. LACK — Coney Island Hospital — 2 to 4. Surgical operations.

O. S. RITCH — Cumberland Street Hospital — 1 to 3. Surgical operations.
G. H. ILER — Cumberland Street Hospital — 3 to 5. Surgical operations.
J. P. WARBASSE — German Hospital — 10 to 1. Surgical operations.
J. H. DROGE — German Hospital — 2 to 4. Nose and throat operations.
R. MOORHEAD — German Hospital — 3 to 4. Nose and throat operations.
W. LINTZ — Hoagland Laboratory — 2 to 4. Pathological laboratory exhibit.
J. MORRIS and V. ZIMMERMAN — Holy Family Hospital — 10 to 12. Gynecological operations.
R. SULLIVAN — Holy Family Hospital — 2 to 4. Surgical operations.
G. McNAUGHTON — Jewish Hospital — 9 to 12. Gynecological operations.
R. M. BEACH — Jewish Hospital — 2 to 4. Obstetrical operations.
J. B. BOGART — Kings County Hospital — 10 to 12. Surgical operations.
G. McNAUGHTON — Kings County Hospital — 2 to 4. Gynecological operations.
A. MURRAY — Kings County Hospital — 2 to 4. Pathological laboratory exhibit.
E. A. PARKER — Williamsburgh Hospital — 2 to 4. Surgical operations.
J. B. DOWD — Williamsburgh Hospital — 2 to 4. Gynecological operations.
J. O. POLAK — Long Island College Hospital — 9 to 12. Gynecological operations.
H. H. Morton — Long Island College Hospital — 10 to 12. Genito-urinary operations.
W. F. DUDLEY and P. H. STURGES — Long Island College Hospital — 2 to 4. Nose and throat operations.
T. R. FRENCH — Long Island College Hospital — 3:30. Nose and throat operations (ether in upright position).
J. M. VANCOTT — Long Island College and Hoagland Laboratory — 2 to 4. Pathological laboratory exhibit.
T. B. SPENCE — Methodist Episcopal Hospital — 9 to 11. Surgical operations.
C. H. GOODRICH and W. F. CAMPBELL — Methodist Episcopal Hospital — 11 to 1. Surgical operations.
W. TRUSLOW — Methodist Episcopal Hospital — 2 to 3. Orthopedic clinic.
H. B. DELATOUR — Norwegian Hospital — 9 to 11. Gynecological and surgical operations.
E. D. FERRIS — Norwegian Hospital — 10 to 12. Gynecological and surgical operations.
P. M. PILCHER — Pilcher Private Hospital — 9 to 12. Surgical operations.
J. F. RANKIN — Prospect Heights Hospital. Gynecological clinic.
N. ROBINSON — Prospect Heights Hospital — 3 to 5. Surgical operations.
P. HUGHES — St. Catherine's Hospital — 9 to 12. Surgical operations.
P. M. PILCHER — St. John's Hospital — 10 to 12. Genito-urinary clinic.
A. T. BRISTOW — St. John's Hospital — 10 to 1. Gynecological and surgical operations.
E. A. PARKER — St. Mary's Hospital — 9 to 12. Surgical operations.
L. G. BALDWIN — St. Peter's Hospital — 9 to 12. Gynecological operations.
J. F. TODD — St. Peter's Hospital — 11 to 1. Gynecological operations.
A. M. JUDD — Swedish Hospital — 10 to 12. Gynecological operations.

Friday, November 15th

W. C. WOOD — Brooklyn Hospital — 10 to 12. Surgical operations.
R. L. DICKINSON — Brooklyn Hospital — 2 to 4. Gynecological operations.
H. ARROWSMITH — Brooklyn Eye and Ear Hospital — 1:30 to 3:30. Nose and throat operations.
F. L. TUCKER — Brooklyn Eye and Ear Hospital — 2 to 4. Nose and throat clinic.
H. H. WAUGH and F. DE F. BAILEY — Brooklyn Eye and Ear Hospital — 2 to 4. Eye clinics.
J. C. RUSHMORE — Brooklyn Eye and Ear Hospital — 2. to 3 Eye operations.
W. SIMMONS — Brooklyn Eye and Ear Hospital — 3 to 4. Eye operations.
W. C. BRAISLIN, C. N. COX, W. S. SHATTUCK and H. A. ALDERTON — Brooklyn Eye and Ear Hospital — 2 to 4. Ear clinics.
S. LUTZ — Brooklyn Eye and Ear Hospital — 3:30 to 5. Ear operations.
W. H. PIERSON — Cumberland Street Hospital — 1 to 3. Gynecological operations.
J. F. RANKIN — Cumberland Street Hospital — 3 to 5. Gynecological operations.
H. C. ALLEN and T. A. BUYS — Cumberland Street Hospital — 3 to 5. Obstetrical operations.
R. S. FOWLER — German Hospital — 10 to 1. Surgical operations.
M. G. WASCH — Jewish Hospital — 1 to 2:30. X-Ray clinic.
W. LINDER — Jewish Hospital — 2 to 4. Surgical operations.
V. H. PENTLARGE — Jewish Hospital — 2 to 4. Genito-urinary clinic.
S. M. WINFIELD — Kings County Hospital — 10 to 12. Syphilis and cancer clinic.
C. EASTMOND — Kings County Hospital — 11 to 12. X-Ray clinic.
A. T. BRISTOW — Long Island College Hospital — 10 to 12. Surgical operations.
S. READ, N. P. RATHBUN, P. M. PILCHER, W. R. ISZARD, B. HARRIS and R. DURHAM — Long Island College Hospital — 2 to 4. Genito-urinary clinics.
J. B. BOGART — Methodist Episcopal Hospital — 9 to 11. Surgical operations.
W. A. SHERWOOD — Methodist Episcopal Hospital — 11 to 1. Surgical operations.
P. M. PILCHER — Pilcher Private Hospital — 9 to 12. Surgical operations.
J. F. RANKIN — Prospect Heights Hospital. Gynecological clinic.
M. FIGUEIRA — St. Catherine's Hospital — 9 to 12. Surgical operations.
J. G. WILLIAMS — St. Catherine's Hospital — 11 to 12. X-Ray clinic.
W. B. BRINSMADE — St. John's Hospital — 9 to 12. Gynecological and surgical clinic.
O. A. GORDON — St. Mary's Hospital — 9 to 12. Surgical operations.

J. P. GLYNN — St. Mary's Hospital — 2 to 4. Gynecological operations.
W. S. SIMMONS — Swedish Hospital — 10 to 12. Surgical operations.
J. G. DICKERT — Williamsburgh Hospital — 10 to 12 Gynecological operations.
C. A. GORDON — Williamsburgh Hospital — 2 to 4. Gynecological operations.

Saturday, November 16th

R. W. WESTBROOK — Brooklyn Hospital — 10 to 12. Surgical operations.
W. H. STEERS — Brooklyn Eye and Ear Hospital — 2 to 4. Nose and throat operations.
B. C. COLLINS — Brooklyn Eye and Ear Hospital — 2 to 4. Ear operations.
D. W. MEYER — Brooklyn Eye and Ear Hospital — 2 to 4. Eye clinic.
J. S. WOOD — Brooklyn Eye and Ear Hospital — 3. Eye operations.
H. D. SCHENCK — Cumberland Street Hospital —2 to 3. Eye operations.
F. WEISBROD — German Hospital — 10 to 1. Surgical operations.
A. M. JUDD — Jewish Hospital — 9 to 12. Gynecological operations.
O. P. HUMPSTONE — Jewish Hospital — 2 to 4. Obstetrical operations.
C. BARBER — Kings County Hospital — 9 to 11. Surgical operations.
H. E. FRASER — Kings County Hospital — 2 to 4. Genito-urinary operations.
E. PALMER — Long Island College Hospital — 10 to 12. Gynecological operations.
P. H. STURGES — Long Island College Hospital — 1 to 3. Nose and throat clinic.
T. B. SPENCE — Methodist Episcopal Hospital — 9 to 11. Surgical operations.
W. F. CAMPBELL — Methodist Episcopal Hospital — 11 to 1. Surgical operations.
R. S. FOWLER — Methodist Episcopal Hospital — 2 to 4. Surgical operations.
P. M. PILCHER — Pilcher Private Hospital — 9 to 12. Surgical operations.
J. F. RANKIN — Prospect Heights Hospital. Gynecological clinic.
J. A. LEE — St. Mary's Hospital — 9 to 12. Surgical operations.
W. F. CAMPBELL — Trinity Hospital — 2 to 5. Surgical operations.

GENERAL GENITO-URINARY CLINICS

EDWARD L. KEYES, JR. — Bellevue Hospital. Operative clinic.
A. T. OSGOOD — Bellevue Hospital. Operative clinic.
J. RAYNOR HAYDEN — Bellevue Hospital — Nov. 12, 2 P. M. Operative clinic.
J. BAYARD CLARKE — Bellevue Hospital. Operative clinic.
J. F. McCARTHY — Bellevue Hospital. Operative clinic.
EUGENE FULLER — City Hospital — Nov. 13 and 16, 2 P. M. Surgery of the seminal vesicles.
FRANCIS CARTER WOOD — Columbia University, Medical Department. Exhibition of pathological genito-urinary specimens.
RAMON GUITERAS — Columbus Hospital. Operative clinic.
WILLY MEYER — German Hospital. Operative clinic.
GEORGE K. SWINBURNE — Good Samaritan Dispensary. Operative clinic.
J. F. ERDMANN — Gouverneur Hospital. Operative clinic (Kidney).
BUKK G. CARLETON — Hahnemann Hospital — Nov. 12, 2 P. M. Operative clinic.
SPRAGUE CARLETON — Hahnemann Hospital. Operative clinic.
J. J. MOREHEAD — Harlem Hospital. Operative clinic.
BUKK G. CARLETON — Flower Hospital. Operative clinic.
SPRAGUE CARLETON — Flower Hospital — Nov. 12 and 16. Operative clinic.
K. B. PAGE — Peoples Hospital. Operative clinic.
CHARLES H. CHETWOOD — J. Hood Wright Hospital. Operative clinic.
J. STURDIVANT READ — Long Island College Hospital. Cystoscopic demonstrations.
BUKK G. CARLETON — Metropolitan Hospital — Nov. 11 and 15. Operative clinic.
SPRAGUE CARLETON — Metropolitan Hospital. Operative clinic.
EDWIN BEER — Mt. Sinai Hospital. Operative clinic.
LEO BUERGER — Mt. Sinai Hospital — Nov. 11, 9 A. M.; Nov. 13, 2 P. M. Operative clinic.
HOWARD LILIENTHAL — Mt. Sinai Hospital. Operative clinic.
FRED S. MANDELBAUM — Mt. Sinai Hospital — Nov. 11, 9 A. M. Genito-urinary pathology.
HERMAN GOLDENBERG — Mt. Sinai Hospital. Treatment of lues.
J. BENTLEY SQUIER — New York City Home Hospital. Operative clinic.
CHARLES H. CHETWOOD — Polyclinic Hospital. General clinic daily.
J. BENTLEY SQUIER — Post Graduate Hospital — Nov. 13, 12 M. Operative clinic (Prostatic surgery). General clinic daily.
EUGENE FULLER — Post Graduate Hospital. Operative clinic.
RAMON GUITERAS — Post Graduate Hospital. Operative clinic. Extrophy of bladder.
J. F. ERDMANN — Post Graduate Hospital. Operative clinic (Kidney surgery).
J. F. McCARTHY — Post Graduate Hospital. Operative cystoscopy.
JAMES PEDERSEN — Post Graduate Hospital. Clinical teaching.
C. G. BANDLER — Post Graduate Hospital. General clinic.
A. L. WOLBARST — Peoples Hospital. Demonstration of urinary tests.
C. A. McWILLIAMS — Presbyterian Hospital. Operative clinic.
PAUL M. PILCHER — Pilcher Private Hospital. Operative clinic (Renal, vesical and prostatic cases).

GEORGE E. BREWER — Roosevelt Hospital. Operative clinic (Kidney surgery).
WILLIAM B. COLEY — Ruptured and Crippled Hospital. Operative clinic (Undescended testicle).
JOHN B. WALKER — Ruptured and Crippled Hospital. Operative clinic.
FRANCIS C. EDGERTON — St. Francis Hospital. Operative clinic.
JOHN PATRICK McGOWAN — St. Bartholomew's clinic. Demonstration.
E. E. SMITH — Smith Private Laboratory. Demonstration of Wasserman reaction.
FREDERICK E. SONDERN — Sondern Private Laboratory. Demonstration of laboratory technique genito-urinary diagnosis.
J. BENTLEY SQUIER — Sailors' Snug Harbor Hospital. Operative clinic.
R. N. SEVERANCE — Sailors' Snug Harbor Hospital. Operative clinic.
J. RAYNOR HAYDEN — Vanderbilt Clinic. General clinic daily.
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Good Books on Surgery

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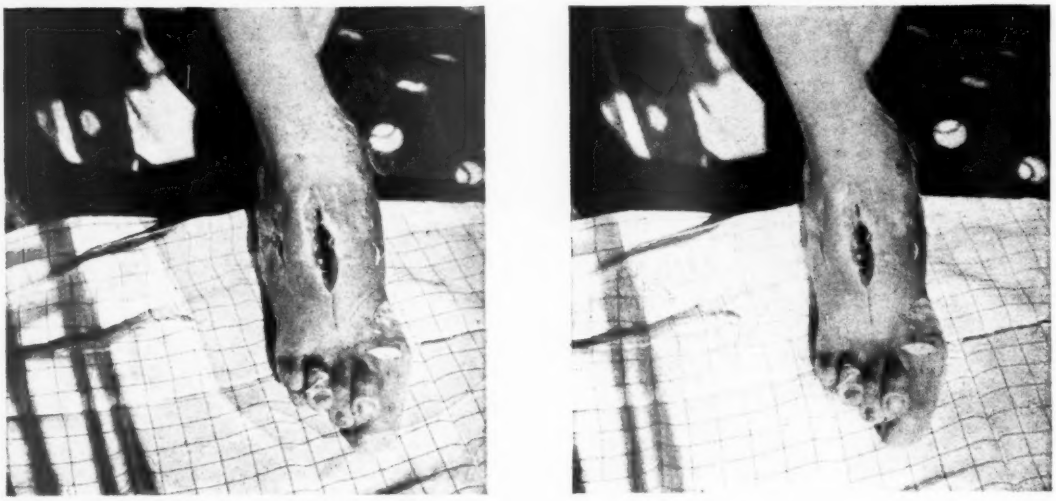

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